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# THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

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## *Original Communications*

# I. A COMPARATIVE STUDY OF TOTAL SALIVARY AND BLOOD CALCIUM IN VARYING TYPES OF INDIVIDUALS WITH SPECIAL REFERENCE TO CASES OF PREGNANCY. II. FOCAL INFECTION*

By U. G. RICKERT, M.S., D.D.S., and FAITH PALMERLEE, M.S.,
Ann Arbor, Michigan

### Introduction

AIDED by small grants from the American Dental Association Research Fund, certain fundamentals concerning the causes of dental caries were investigated in our laboratories from 1913 to 1917. At the end of this time, the problem of focal infection as related to pulpless teeth loomed up with such importance that it became necessary to divert temporarily our attention to investigations in this field because there was so much uncertainty as to what should be the teaching and practice in the management of pulpless teeth. About this time, the Michigan State Dental Society turned over to the treasury of the University funds to provide means of clarifying the problem. As the results of the work have been published,[1] they will be considered only briefly in this report.

While the investigations in both of the above mentioned fields have given us additional information, there are certain leads that we met in both studies which

*A report of the work done in the laboratories of the College of Dental Surgery of the University of Michigan during the year 1922-1923, under the auspices and with the assistance of the American Dental Association.

1. Rickert, U. G.: Report of Research Committee, Financed by the Michigan State Dental Society, J. A. D. A., 9:300 (April) 1922; Research Report for the Michigan State Dental Society, ibid., 9:690 (Aug.) 1922.

were not completed. In outlining the work for the past year, it became evident that the necessary clinical material, especially in the infection work, was not always available because of the specific types of patients required, and in order to have before us at all times an abundance of material, thus avoiding loss of time, we, this year, continued with the unfinished work in both problems previously studied.

## Part One

The first part of our report will be devoted to causative factors of dental caries. It will be necessary for us to use the terms, "immune" and "susceptible," in a rather arbitrary sense. Definite lines between "immunity to caries" and "susceptibility to caries" cannot always be established. When we use the term "immune to caries," we refer to patients of middle age, or past, who have had little or no caries and who give a history of parentage equally free from caries. By "susceptibility to caries," we mean active cases in which all conditions are favorable, such as pregnancy, or other general pathologic processes.

Our report of 1915 called attention to the increased salivary calcium content of persons relatively immune to caries. We further demonstrated the decreased amounts in those highly susceptible to caries. This work has since been substantiated by a number of other workers. At that time, no claims were made that this was an active factor in the cause of caries, but the condition ran so nearly parallel to dental states that, to us, at least, it suggested a direct bearing. Naturally, then, it was logical, in our studies the succeeding year to attempt an explanation of the possible ways that the environmental fluid might affect enamel structure. It was held generally that the enamel was an unchanging structure after the loss of Nasmyth's membrane. That there was one exception, possibly two, including the crystalline lens of the eye, of tissue absolutely devoid of metabolic changes, always appeared open to question. There was clinical evidence that the enamel might select, under certain conditions, materials from the circulating fluids favorable in some cases and unfavorable in others. We held that, if such changes occurred, the enamel must be permeable. Up to that time, attempts at staining for the purpose of demonstrating permeability had met with a varying degree of success. In our report of 1915[2] we produced evidence indicating that the enamel may be more than a simple, dead, inert covering of dentin; and that, in principle, it acts like a permeable membrane. This work has been corroborated by Bodecker[3] and several others. It is highly probable that this property is active under normal conditions during the life of the tooth. It is also highly probable that, through this property, saliva is actively concerned in the health of the tooth. We need no better evidence of this than clinical observation of cases of xerostomia, in which the lack of acid neutralization plays a secondary part.

Now that we have established the fact that enamel is a permeable membrane, it has become easier to visualize how that tissue may be built up and torn down. It is not an established fact that the presence of better qualities of enamel is the direct result of the higher amounts of lime salts of the saliva, although this theory is supported to a limited extent by clinical evidence. We have demonstrated repeatedly that the better enamels are found in the presence of saliva high in lime content. Our future work will

2. Bunting, R. W., and Rickert, U. G.: Dental Caries, J. N. D. A., 2:247 (Aug.) 1915.

3. Bodecker, C. F.: Permeability of the Enamel in Relation to Stains, J. A. D. A., 10:60 (Jan.) 1923.

be directed toward clarifying, if possible, the direct relationship. A more detailed discussion of this phase of the subject was read before the Section on Histology at the Cleveland meeting, 1923.[4]

In view of the great amount of work in progress with respect to calcium metabolism, the relation of calcium in the diet to the teeth, reported by McCollum, Grieves and Howe, and our own work concerning the significance of calcium of the saliva, it seemed that we could make no better contribution than to determine the relative relationship of the lime content of blood and of saliva taken from the same individual. To be explicit, we wished to know whether saliva with the higher lime content was a relatively true expression of the higher content of the blood, and vice versa. It is evident, since there are greater technical difficulties in obtaining blood for making the calcium determinations than in obtaining saliva, that, if there were a constant relationship between the two, for our purposes saliva might be analyzed instead of blood. Reports from Johns Hopkins and Harvard indicate that the lime content of the normal human blood tends to be rather constant; at least there are no such marked differences as we have observed in saliva. We, too, made a large number of determinations of calcium in blood from normal individuals this year and found the variation of calcium in the saliva much greater than in the blood.

TABLE 1.—Variation in Blood Calcium and Salivary Calcium in Normal Cases

| Case | Blood Calcium Mg. Ca per Hundred CC. of Serum | Salivary Calcium Gm. CaO per 25 CC. | Case | Blood Calcium Mg. Ca per Hundred CC. of Serum | Salivary Calcium Gm. CaO per 25 CC. |
|---|---|---|---|---|---|
| 1 | 9.3 | 0.00183 | 17 | 10.4 | 0.00371 |
| 2 | 9.3 | 0.00277 | 18 | 10.4 | 0.00205 |
| 3 | 9.6 | 0.00246 | 19 | 10.5 | 0.00285 |
| 4 | 9.6 | 0.00308 | 20 | 10.5 | 0.00236 |
| 5 | 9.6 | 0.00400 | 21 | 10.5 | 0.00183 |
| 6 | 9.7 | 0.00215 | 22 | 10.6 | 0.00277 |
| 7 | 9.8 | 0.00340 | 23 | 10.7 | 0.00215 |
| 8 | 9.8 | 0.00215 | 24 | 11.0 | 0.00121 |
| 9 | 9.9 | 0.00215 | 25 | 11.0 | 0.00337 |
| 10 | 9.9 | 0.00340 | 26 | 11.1 | 0.00370 |
| 11 | 10.0 | 0.00236 | 27 | 11.2 | 0.00122 |
| 12 | 10.0 | 0.00308 | 28 | 11.3 | 0.00246 |
| 13 | 10.0 | 0.00215 | 29 | 11.4 | 0.00371 |
| 14 | 10.1 | 0.00371 | 30 | 11.5 | 0.00246 |
| 15 | 10.1 | 0.00121 | 31 | 12.6 | 0.00370 |
| 16 | 10.3 | 0.00298 | Total Averages | 10.4 | 0.00266 |

*Blood Calcium in Normal Cases.*—The results of the study of variations of blood calcium and salivary calcium in average or normal cases, which were examined for the purpose of comparison with cases in pregnancy or shortly after delivery, are presented in Table I. The method used in the blood determinations was substantially that of Kramer and Tisdall, while the salivary determinations were made by our own methods already reported.[2]

From the table it appears that there is no appreciable correlation between

4. Rickert, U. G.: Evidences of Structural Changes of Enamel, J. A. D. A., 11:391 (May) 1924.

variation in blood calcium and variation in salivary calcium. In order to test these data further, the cases were divided into eight groups on the basis of the amount of blood calcium, and the salivary calcium average for the same cases was plotted against each group as shown in Table 2.

TABLE 2.—Variation in Blood Calcium and Salivary Calcium in Groups of Cases Based on Difference in Blood Calcium

| | I | II | III | IV | V | VI | VII | VIII |
|---|---|---|---|---|---|---|---|---|
| Variation in Blood Calcium | 9.3–9.6 | 9.7–10 | 10.1–10.4 | 10.5–10.8 | 10.9–11.2 | 11.3–11.6 | 11.7–12 | 12.1–12.6 |
| Salivary Calcium Average | 0.00282 | 0.00260 | 0.00273 | 0.00239 | 0.00237 | 0.00287 | No Cases | 0.0037 |
| Blood Calcium Average | 9.48 | 9.88 | 10.26 | 10.56 | 11.07 | 11.4 | No Cases | 12.6 |

From the data in this table, it is clear that, in the normal cases considered, there was no correlation between the variations in blood calcium and in salivary calcium. Indeed, the results appear to show a slight negative correlation, since, on the whole, as the amount of blood calcium increases, the amount of salivary calcium decreases in certain groups. Class VII is deficient, and Class VIII is of slight significance because it is represented by one case only. Perhaps the most that can be said from this study is that there is no observable correlation in normal cases. It would appear that the determination of salivary calcium cannot be made to serve even as a relative index of the amount of calcium in the blood.

*Blood Calcium in Pregnancy Cases.*—The same methods were employed in pregnancy cases, in some before and in some after delivery. The first group, data on which are presented in Table 3, includes only examinations made about one month before delivery.

Groups were formed, based on the relative amount of blood calcium, and

TABLE 3.—Variation in Blood Calcium and Salivary Calcium in Pregnancy Cases Before Delivery

| Case | Blood Calcium Mg. Ca per Hundred CC. of Serum | Salivary Calcium Gm. CaO per 25 CC. | Case | Blood Calcium Mg. Ca per Hundred CC. of Serum | Salivary Calcium Gm. CaO per 25 CC. |
|---|---|---|---|---|---|
| 1 | 9.0 | 0.00139 | 14 | 9.8 | 0.00144 |
| 2 | 9.6 | 0.00119 | 15 | 9.9 | 0.00060 |
| 3 | 9.6 | 0.00070 | 16 | 9.9 | 0.00239 |
| 4 | 9.7 | 0.00090 | 17 | 9.9 | 0.00139 |
| 5 | 9.7 | 0.00015 | 18 | 9.9 | 0.00267 |
| 6 | 9.7 | 0.00119 | 19 | 10.0 | 0.00264 |
| 7 | 9.7 | 0.00159 | 20 | 10.1 | 0.00069 |
| 8 | 9.7 | 0.00139 | 21 | 10.1 | 0.00159 |
| 9 | 9.7 | 0.00173 | 22 | 10.1 | 0.00194 |
| 10 | 9.8 | 0.00209 | 23 | 10.1 | 0.00114 |
| 11 | 9.8 | 0.00214 | 24 | 10.8 | 0.00205 |
| 12 | 9.8 | 0.00101 | 25 | 11.0 | 0.00189 |
| 13 | 9.8 | 0.00139 | Total Averages | 9.9 | 0.00149 |

plotted against the average salivary calcium of this group, in order to discover any possible correlation, with the results shown in Table 4.

In these cases, although there appears to be a slight increase in salivary calcium with increase in blood calcium, the differences are very slight and may be of no significance. In any case, the correlation is not sufficiently definite to justify using salivary calcium as an index of blood calcium.

TABLE 4.—Variation in Blood Calcium and Salivary Calcium in Groups of Pregnancy Cases Based on Difference in Blood Calcium

| | I | II | III | IV |
|---|---|---|---|---|
| Variations in Blood Calcium | 9–9.5 | 9.6–10 | 10.1–10.5 | 10.6–11.0 |
| Average Salivary Calcium | 0.00139 | 0.00148 | 0.00134 | 0.00197 |
| Average Blood Calcium | 9.0 | 9.8 | 10.1 | 10.9 |

The foregoing tables offer opportunity for a comparison between blood calcium and salivary calcium in normal and pregnant persons. The averages may be regrouped as shown in Table 5.

TABLE 5.—Averages Obtained in Normal and in Pregnant

| Class | Blood Calcium Mg. Ca per Hundred CC. Serum | Salivary Calcium Gm. CaO per 25 CC. Serum |
|---|---|---|
| Normal | 10.4 | 0.00266 |
| Pregnant | 9.9 | 0.00149 |

Here we observe a significant difference, showing a higher calcium content for both blood and saliva in the normal cases.

From the foregoing, it would appear that, if we could control the lime content in both the blood and the saliva, it would be a most rational means for the study of control of dental caries. While other means for such control are quite possible, the management of the diet seems to be the most promising at the present time. The possibility of preventing increased susceptibility to caries during pregnancy is far from hopeless.

*Degree of Variability in Blood and Salivary Calcium in Normal and Pregnant Persons.*—One other point shown in the foregoing tables is worthy of note; that is, the relative variability of blood calcium and salivary calcium in the normal and in the pregnant. The range of variation in the blood in the thirty-one normal persons extended from 9.3 to 12.6, while in the twenty-five pregnant, the range was only from 9 to 11, and, excluding the single instance of 9.0, would have been, for the remaining twenty-four cases, only from 9.6 to 11. Although the coefficients of variability have not been worked out for these two classes, a glance at the tables indicates that, in pregnant persons, some factors are at work which serve to bring about approximate uniformity in the calcium content of the blood, and perhaps to a lesser extent of the saliva.

*Blood Calcium in Postpartum Cases.*—In order to ascertain what, if any, changes occurred in the blood calcium or salivary calcium after delivery and during lactation, fifteen of the twenty-five cases were followed up for

subsequent examination. The examinations of this group were made ordinarily the ninth or tenth day after delivery. The results of these tests are given in Table 6.

The results indicate a slight decrease in blood calcium and a slight increase in salivary calcium during the first ten days of lactation (blood, 9.9 to 9.6; and saliva 0.00155 to 0.00175). These results might perhaps appear significant except for the following circumstances: In nine cases, the blood calcium dropped; while it increased in five, and was stationary in one. The salivary calcium dropped in six cases and increased in nine, as shown in Table 7.

TABLE 6.—Variation in Blood Calcium and Salivary Calcium in Cases of Pregnancy Before and After Delivery

| | Before Delivery | | After Delivery | |
|---|---|---|---|---|
| Case | Blood Ca | Saliva Ca | Blood Ca | Saliva Ca |
| 1 | 9.7 | 0.00119 | 9.0 | 0.00189 |
| 2 | 9.7 | 0.00159 | 9.0 | 0.00149 |
| 3 | 9.7 | 0.00159 | 9.2 | 0.00183 |
| 4 | 9.8 | 0.00144 | 9.3 | 0.00239 |
| 5 | 9.9 | 0.00239 | 9.3 | 0.00219 |
| 6 | 10.1 | 0.00069 | 9.3 | 0.00139 |
| 7 | 9.8 | 0.00209 | 9.5 | 0.00189 |
| 8 | 9.7 | 0.00099 | 9.7 | 0.00239 |
| 9 | 9.9 | 0.00139 | 9.7 | 0.00094 |
| 10 | 10.8 | 0.00205 | 9.8 | 0.00139 |
| 11 | 9.7 | 0.00139 | 9.9 | 0.00164 |
| 12 | 9.9 | 0.00069 | 10.1 | 0.00089 |
| 13 | 10.1 | 0.00194 | 10.2 | 0.00169 |
| 14 | 9.6 | 0.00119 | 10.2 | 0.00159 |
| 15 | 10.0 | 0.00264 | 10.5 | 0.00273 |
| Average | 9.9 | 0.00155 | 9.6 | 0.00175 |

TABLE 7.—Changes in Calcium After Delivery

| Observed Change After Delivery | Calcium Content | |
|---|---|---|
| | Blood | Saliva |
| Increased | 5 | 9 |
| Decreased | 9 | 6 |
| Stationary | 1 | 0 |

Although in certain individuals the drop in blood calcium was very definite, the results as a whole fail to reveal any marked changes in the blood calcium and salivary calcium in the first ten days postpartum.

Relative to correlation between variations in blood calcium and salivary calcium in the pregnancy cases, the data presented make it appear not only that any degree of positive correlation is lacking, but also that a slight negative correlation is shown as in the normal cases.

*Calcium Changes in the Blood of Rats.*—In addition to the work outlined above, calcium determinations were made on the blood of rats on low calcium diets to ascertain whether diet, as the rat approached the rachitic stage, decreased the content of calcium in the blood.

In this study, the blood calcium of the same rats was followed by successive examinations at intervals of from ten days to two weeks. Ordinarily, a rat was bled for five or six tests. The method involved etherizing the rat, attaching it to a dissecting board by push pins, and removing 2 or 3 c.c. of blood by cardiac puncture. The rats tolerate the bleeding well and appear to make a recovery within two hours' time, provided care is exercised in the technic of bleeding.

The blood calcium of normal rats on

normal rations was found to vary from 10.0 to 14.0 mg. per hundred c.c. of serum. Five rats were taken from the normal stock diet group; bled, and then put on low calcium diet and bled at intervals for a period of two months. The results are shown in Table 8.

The lowest figures obtained, 8.3 and 6.2, on Rat II, were found when the rat was pregnant (8.3) and when it was nursing six young (6.2). The rise to 11.0 occurred after the young were weaned. No significance can be attached, however, to this fact, as it is based on only one case. We expect to follow it up in the future, when we have more material at hand.

TABLE 8.—Blood Calcium Determinations on Rats on a Low Calcium Diet

| Bleedings | Rat I Female | Rat II Female | Rat III Female | Rat IV Male | Rat V Male |
|---|---|---|---|---|---|
| Original Blood Ca. On Diet | 12.2 | 12.0 | 10.8 | 14.0 | 13.4 |
| 8 days | 10.7 | 9.1 | 10.1 | 9.9 | 10.5 |
| 18 days | 9.9 | 9.8 | | 9.9 | |
| 29 days | 8.9 | 8.3 | 9.9 | 9.9 | 10.2 |
| 35 days | 8.5 | 6.2 | 10.6 | | 11.8 |
| 50 days | 10.1 | 11.0 | 9.8 | 10.6 | 10.5 |

## PART TWO

The second part of this report is devoted to a continuation of our work on infection. In reports already published[1] we stated our findings regarding pulpless teeth. In an attempt to clarify the opinions relative to the importance of such teeth, we cultured a large number of the general run of pulpless teeth, the material being checked up by other means to determine whether it was infected. The results of our work demonstrated to us that a certain percentage of such teeth are infected, but that a large percentage of the general run of pulpless teeth that have been carefully treated in normal individuals are not infected; moreover, that certain types of patients offer little resistance toward some strains of the streptococcus group and so should not be permitted to retain possible foci of infection, such as many pulpless teeth may present. These patients, however, are a small percentage as compared with the large group that may, with safety, retain pulpless teeth provided proper treatment has been given. In a later contribution, we undertook investigations directed toward more accurate diagnosis. To be explicit, we hoped to be able to outline some definite technic whereby the physician and dentist might be able to differentiate more accurately between the patient in whom treatment is an unsafe procedure and the patient who will suffer no ill effects subsequent to suitable treatment. We called attention to the fact that mere demonstration that a tooth was infected was not sufficient evidence to many conservative operators that such teeth must be extracted and should not be treated. We resorted to laboratory methods whereby we hoped to take advantage of specific localization, believing that, when definite specificity of the infective organism existed, no dentist would feel safe in treating, but would on the other hand feel secure in removing the tooth. While a small percentage of cultures taken from the teeth of patients suffering from some type of low grade infection gave evidence of more or less definite localizations, such specificity was far too uncommon to make it valuable as a means of diagnosis, and is of

laboratory interest only. While we have carried on a considerable amount of animal experimentation, including a few cases demonstrating a degree of specificity, the work that we have done this year has in no way changed our conclusions as reported previously.

A great deal has been said as to the significance of blood counts in relation to low grade infections. We, too, have made many such counts during the past year, and while it is true that patients suffering from low grade infections do have total white counts slightly above the normal, other factors and foci, not of dental origin, are likewise responsible for such increases, so that in our opinion this means of differentiating dental foci of infection from other foci has failed.

An interesting attempt toward such a differentiation recently attracted the attention of men in both the medical and the dental profession when E. F. Lewis, M.D., reported[5] a number of cases of dental infection positively diagnosed in which the differential leukocyte counts showed marked increases in the basophilic cells. He based the importance of an increased basophil count on the fact that diagnosticians have observed that increases generally occur in a few pathologic conditions that can, with rather marked accuracy, be diagnosed, such as cancer, actinomycosis and various skin diseases, splenomyelogenous leukemia, chlorosis and septic bone disease. It will be seen as his paper indicated, that it would be easy to eliminate the foregoing diseases as a possible cause of the increase in the basophil count. Roentgenographic findings, then, showing bone changes around the apices of the teeth, together with a basophil count above normal are, in the opinion of Dr. Lewis, rather definite evidence that such teeth are contributing factors toward the cause of the trouble. Since the paper received such general approbation and was directed toward the same problem that we have undertaken, we considered it worthwhile to attempt to substantiate the claims of the writer.

First, let us consider the technical difficulties encountered in making a careful differential white cell count in which the basophilic leukocytes are to be especially noted. The stain that is used for the blood smears must be carefully titrated until the basophilic granules and the reticulum of the protoplasm show proper differentiation and thus render it easy to distinguish between them and the neutrophilic cells. Wright's stain was used on our specimens, and, after careful adjustment, the difficulty of recognizing these cells was reduced to a minimum. Then, there is the matter of the count itself. The normal basophil count is commonly stated as being about 0.5 per cent, or one cell to 200 other white cells. This shows that the usual count of 200 cells would not be sufficient to give an accurate estimation of basophils, when chance plays so large a part in determining the results. It might happen that the first 200 cells contain two or three basophils and the second 200 contain none, so it should be emphasized that a large number of cells, at least 600, and preferably more, must be counted in order to reduce the possible error.

At the outset, we made differential blood counts on sixteen apparently normal individuals in order to determine the normal basophil percentage. This was found to vary from 0.0 to 0.8 per cent, the modal group, however, being 0.4 to 0.6, while the mean was 0.46.

TABLE 9.—Distribution of Basophil Counts (Percentages) in Fifteen Normal Cases

| Class | 0 | 0.1–0.3 | 0.4–0.6 | 0.7–0.9 | 1.0 |
|---|---|---|---|---|---|
| Cases | 1 | 3 | 8 | 3 | 0 |

One exception to this was found, however, in an individual in perfect

5. Lewis, E. F.: To be published.

health who had at the time of his first blood count a basophil percentage of 1.7. We followed this up with a second count eight days later, which was 0.6, and a third, five days after the second, in which no basophils at all were found in 800 white cells. This case indicates the difficulty in interpreting correctly a single basophil count.

Subsequent basophil estimations were made of the blood of four patients known to be suffering from bone involvements. Two of these counts were 0.5 and 0.6, respectively, while a third was 1 per cent. This case, however, was one which we were not able to follow for further counts. The fourth case was at first 1, dropping to 0.8, (within the normal range), four days later.

Nine other patients whose trouble had not been definitely diagnosed were examined. Seven of these showed basophil counts below 0.8 while the two having slightly higher primary counts, 1 and 1.5, were down to 0.1 and 0.6, respectively, a few days later.

TABLE 10.—Basophil Counts in Pathologic Cases

| Class | 0.0 | 0.1–0.3 | 0.4–0.6 | 0.7–0.9 | 1.0 | Above 1.0 |
|---|---|---|---|---|---|---|
| Cases Diagnosed | 0 | 0 | 2 | 0 | 2 | 0 |
| Cases Undiagnosed | 2 | 1 | 1 | 2 | 2 | 1 |

In the foregoing table, the mean of the four diagnosed cases referred to was 0.77, while the mean of the undiagnosed cases was 0.61. The combined mean of the diagnosed and undiagnosed cases was 0.69. It is clear that in both groups, although modal classes are not in evidence, the mean basophil count exceeds the mean of the normal cases. The significance of these results, however, is not clear when we consider the marked drop in count in the later examinations. A large body of data is required before final conclusions can be drawn relative to the significance of the basophil count in the diagnosis of pathologic conditions of the teeth.

# CUSP TRAUMA

By FELIX A. FRENCH, D.D.S., Ottawa, Canada

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

CUSP trauma is regarded as one of the greatest causes of inflammation and tissue atrophy about the roots of the natural teeth.

Is it not logical to expect that it is also one of the principal causes of soreness and tissue atrophy under dentures? In the natural dentition, it affects primarily the interfering teeth, while in full dentures, as the teeth are imbedded in a substance which merely rests upon the mucosa, it affects the seating of the denture base as a whole.

To assume that Nature never intended the mucosa to bear the stress of mastication is to lose ourselves in a maze of anatomic and physiologic considerations, and thus to accomplish little. The fact remains that, after all the natural teeth are lost, we have no alternative but to load the mucosa and make the best of it. When pressure, as Nature intended, is brought to bear on a natural tooth, it cushions into its socket with blood displacement. On release of the pressure, the tissues rebound, with return of the blood supply. This is a stimulus that tends to strengthen the supporting tissues and keep them healthy.

Let us try to imagine a similar condition existing under a denture base, not merely in central occlusion but in every working position of the mandible. Any form of arrangement of the teeth that does not permit free movement of the mandible in every possible working position without creating excessive pressure at certain points and under various loads may be classed as cusp trauma. Therefore, a consideration of cusp trauma as related to full dentures involves those factors which govern cusp form and arrangement, if we are to avoid a rocking or tilting, as well as lateral, forward or backward thrust to the denture base while the cusps of the teeth are in moving contact. These factors include the condyle guidances, incisal guidance, ridge form and resilient tissue areas.

Regarding the interpretation of the movements and forces in this combination of factors, there are two different schools,—one advocating the use of articulator mechanisms based on averages in which the condyle guidances, the rotation centers and rotation axis are arbitrarily accepted, and the other, adjustable mechanisms in which these factors are considered by adjustment. I am using some of the data of the latter group because of the variation in cusp form exhibited.

Figure 1 illustrates condyle guidance, cusp planes and incisal guidance, all parallel 33 degrees, maintaining contact in the protrusive movement.

Figure 2 shows 50 degree condyle guidance and 10 degree incisal guidance with entirely different arrangement of cusp planes, being much steeper in the posterior region; also the reverse, 10 degree condyle inclination and 50 degree

incisal guidance with reverse cuspal arrangement, being much steeper in the anterior region.

Figure 3 shows three inclinations of the condyle path. The first is average, the second is less than average and the third is more than average. In the second figure, where the condyle path is inclined less than average, the facets are but little inclined to the occlusal plane; while in the third figure where the condyle path is inclined more than average, the facets are steeply inclined to the occlusal plane. Dr. Gysi[1] contends here that the inclination of the condyle path greatly influences the inclination of those facets of the maxillary bicuspids and molars that look backward, and of the mandibular bicuspids and molars that look forward, these facets being important in the articulation of teeth, especially in the protrusive movement; and further, the inclination of these facets and the consequent cusp height are not a matter of opinion but are determined by the normality or degree of abnormality shown in each case. Mr. Hanau[2] confirms this contention and has since defined the relation between cusp height and condylar inclination for the same masticatory surface formation.

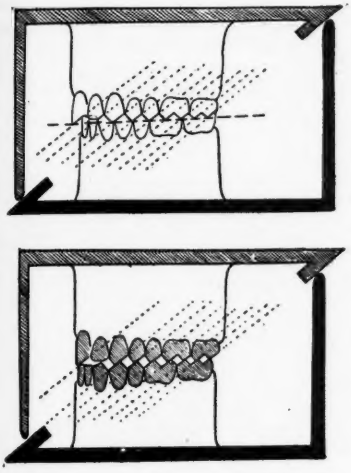

Fig. 1

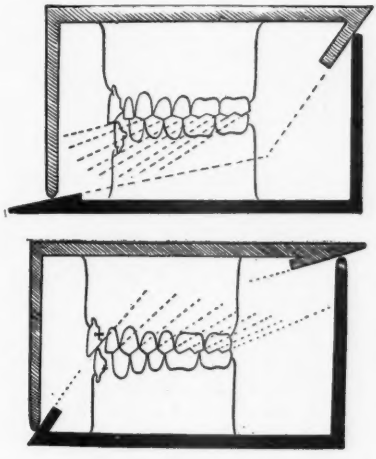

Fig. 2

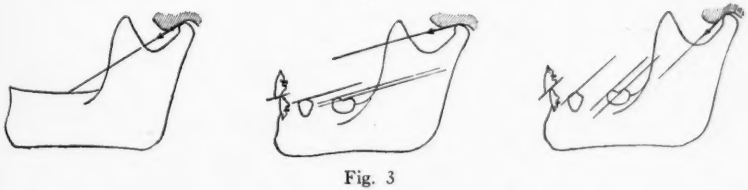

Fig. 3

1. Gysi, A.: Dent. Digest. 26:669, 1920; 27:19, 1921.

2. Hanau, R. L.: Dental Engineering.

Figure 4 illustrates the result of variation in the condyle inclination.

Figure 5 shows the relation between

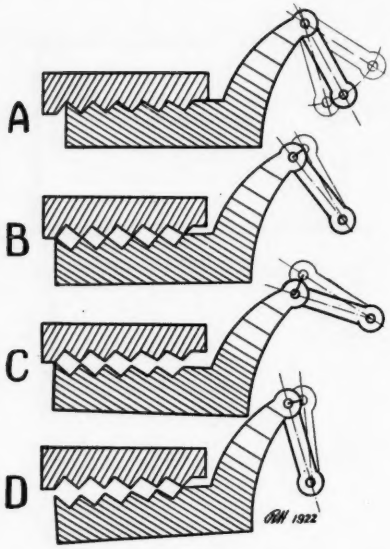


Fig. 4

condylar guidance, incisal guidance and cusp height. Dr. Gysi also claims that from the inclination of the condyle path, we get our cue as to whether we should use deep or shallow bite teeth, and the form of the longitudinal groove of the occlusal surface as shown in Figure 6. He prolongs the occlusal plane backward and locates upon it the rotation point at *R. P.* at the intersection of the

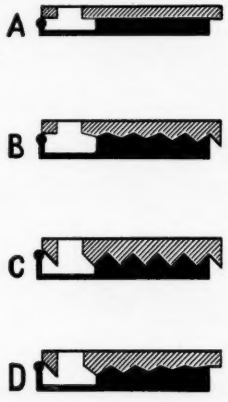


Fig. 5

perpendiculars erected to the records on the horseshoe plate. Through that point, he draws a line perpendicular to the condyle path. From the location of the mandibular second molar, he erects a perpendicular to the occlusal plane, which crosses the line he has just drawn

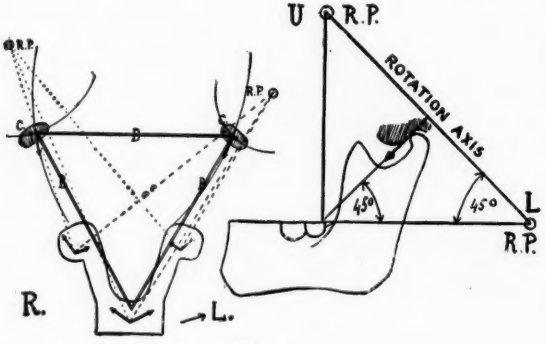


Fig. 6

from the lower rotation point and at right angles to the condyle path, at a point which is marked *U.R.P.*, (upper rotation point). The line from the upper rotation point to the lower rotation point is the axis about which the mandible turns in side bite movements. In Figure 7, Dr. Gysi illustrates the effect of this axis on the linguobuccal form of the occlusal surfaces of the teeth. When the condyle path is inclined very slightly to the occlusal plane, as in the

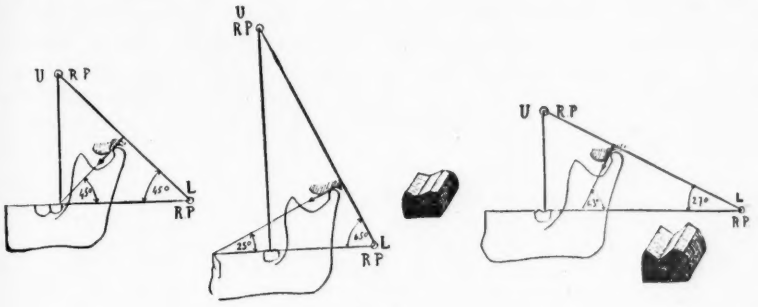


Fig. 7

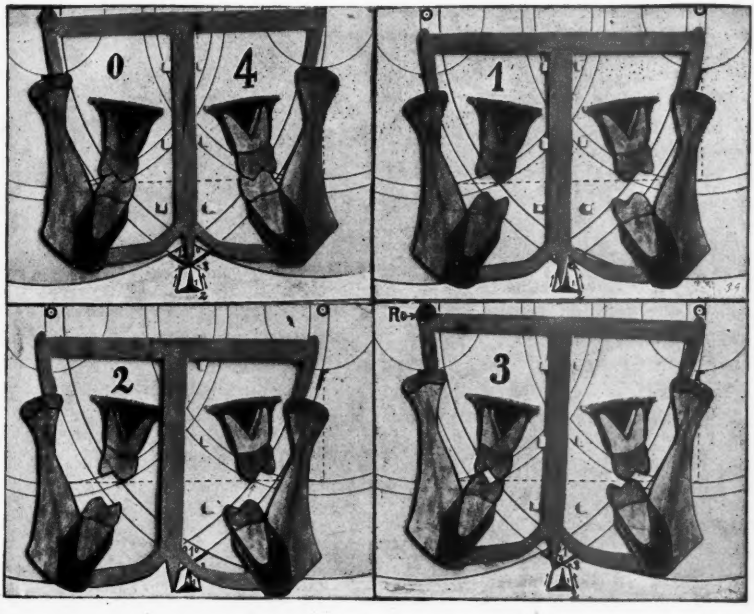


Fig. 8

middle figure, and the upper rotation point is high above the occlusal plane, the longitudinal groove of the occlusal surface will be shallow and the cusps low. When the condyle path is steeply inclined, as in the third figure, the longitudinal groove will be deep and the cusps high.

Figure 8 is a frontal section illustration of the same condition. Figure 9, Dr. Gysi's illustration of how the positions of the rotation centers influence cusp form, are also very interesting. This figure shows on the left rotation centers located between the condyles and nearer the median line than average positions; on the right, two rotation centers located external to the condyles, but equally distant from the median line. Comparing the direction of the arcs for the incisor point and a first molar point in these two cases, it will be noted that they form a much more acute angle in one than in the other.

In Figure 10, the rotation points are equally distant from the median line; also from the condyles, but much further back in one than in the other. As may be noted, there is a difference in the direction of the arcs through the first molar and above each diagram an outline drawing of a mandibular first molar with a black line across the occlusal surface is shown. This black line reproduces the arcs which are shown at the location of the first molar below each tooth, and indicates the path of travel of the lingual cusp of the opposing maxillary molar on the occlusal surface of the mandibular molar. On the molar on the right side of the illustration, the path of travel is quite different from that on the molar on the left side and if the teeth were arranged for side bite movement out of rotation points on the left and the patient manifested side bite movement out of those on the right, the dentures would be liable to be dislodged by unrecognized contacts.

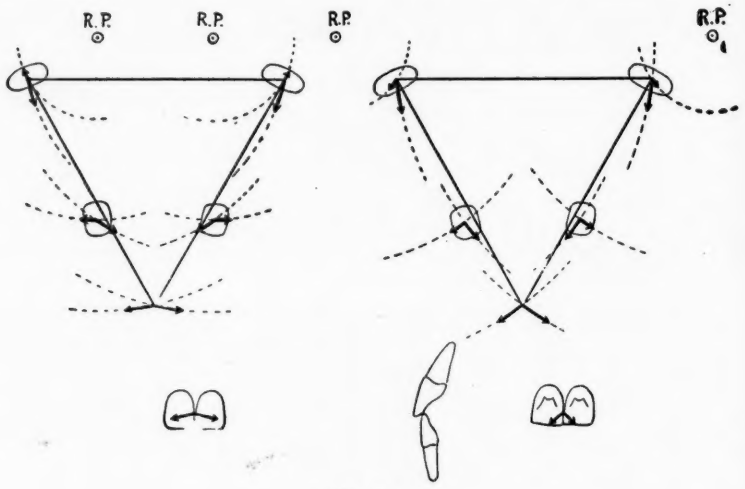


Fig. 9

As these appear to be important factors, it would seem that the solution of the cusp trauma problem, must await the solution of the articulator problem.

Figure 11 illustrates the influence of the curve of Spee on cusp height. As

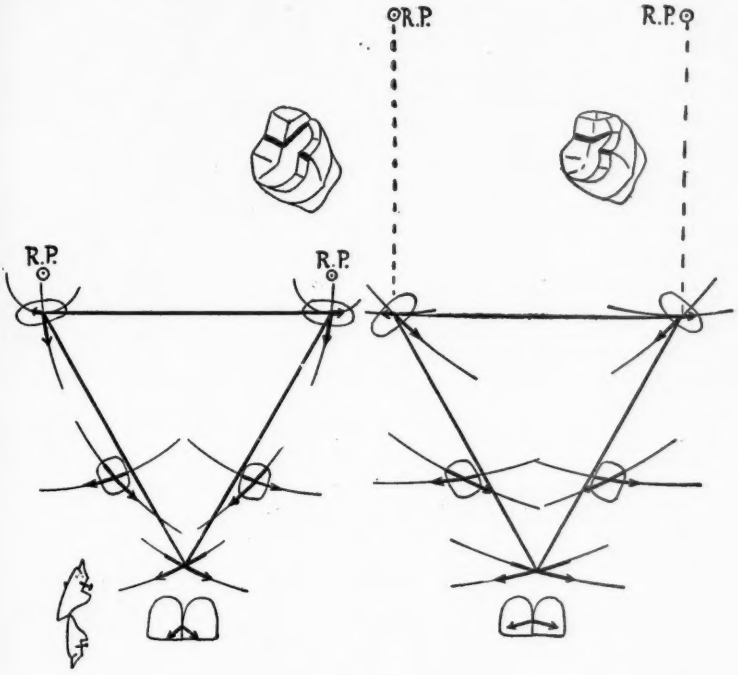


Fig. 10

may be noted, with an upward sweep of the curve of Spee, cusp height decreases. Dr. Gysi injects another factor in here by claiming that the occlusal surfaces of the posteriors should be set parallel to the line of closure of the mandible.

As shown in Figure 12, by means of a cardboard attached to the upper bite rim and a marker attached to the lower bite rim, the opening line is recorded. As shown in Figure 13, a perpendicular from this line represents the line of closure of the mandible and intersects a perpendicular from the condyle path at the opening axis of the mandible. Dr. Gysi cites this case in which teeth set to the usual curve of Spee, as in the upper figure, failed to give satisfaction but did prove satisfactory when altered so that the occlusal surfaces of the posteriors were parallel to the line of closure, as in the lower figure. If I interpret Figure 14 correctly, his contention seems to be that the curve of Spee is governed by the position of the opening axis. As the opening axis approaches the head of the condyle, as in the middle figure, the curve of Spee deepens. As the axis approaches the occlusal plane, the curve

diminishes and, as in the previous slide, it increases in the reverse direction as the axis falls below the occlusal plane. The next factor is that of ridge form (Fig. 15). Here we have a cross-

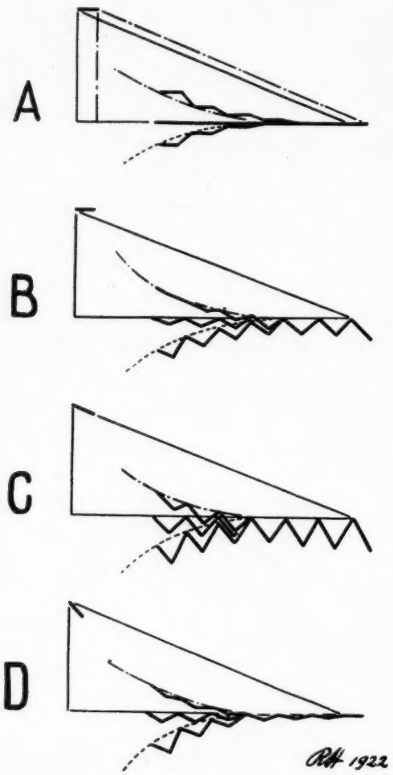


Fig. 11

section at the first molar region of full dentures in central occlusion.

When the mandible takes a lateral excursion, we find this condition illustrated in Figure 16. The line of force is at right angles to the plane of the cusp; the line of force in the direction indicated by the arrows. It is evident that, with a deep cusp formation, there is a marked lateral thrust given the denture base when the cusps of the teeth are

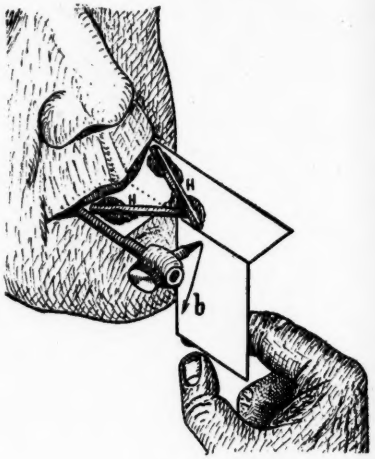


Fig. 12

in moving contact. With a ridge form, as at *A*, capable of taking up lateral

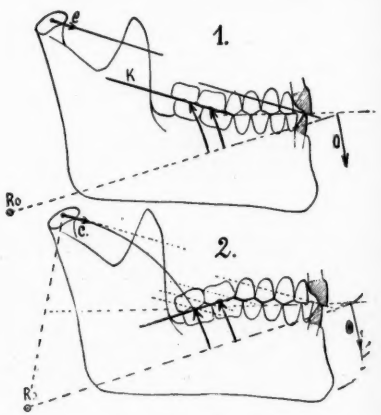


Fig. 13

thrust, there may be no soreness, though it is just possible that the lateral thrust may be sufficient to create a low degree

of tissue atrophy that will in time destroy the ridge.

With a ridge form, as at *B*, incapable of taking up lateral thrust, the result is liable to be soreness at points *C* and *D*.

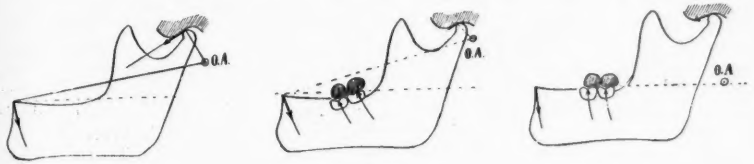


Fig. 14

The general consensus of opinion seems to be that high cusps are contraindicated except for those who have an exact technic and a clear conception of what they are able to do.

The last factor, the consideration of resilient tissue areas, is taken into account by regrinding the finished dentures after bites have been taken under various stresses.

This survey of factors that influence cusp form and arrangement is offered simply in the manner in which it presents

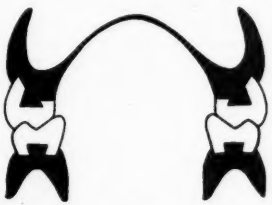

Fig. 15

itself to me and in the spirit of one seeking information.

## Conclusions

My conclusions are not sufficiently definite to warrant expression except in a general way.

With properly antagonized teeth that permit of free mandibular movement and maintain balance in every working position, the seating of the dentures will improve as they are worn; on the other hand, any form or arrangement of the teeth which in working bites produces excessive pressure at certain points, with a corresponding pull at the opposite points, results in tissue atrophy.

Cusp trauma is one of the most serious defects that we have to guard against in full denture construction. It will in time convert a Class 1 ridge into a Class 3 ridge, and it is responsible for many of the Class 3 ridges, particularly lowers, that we see today. We know that an overly tight base or border pressure will

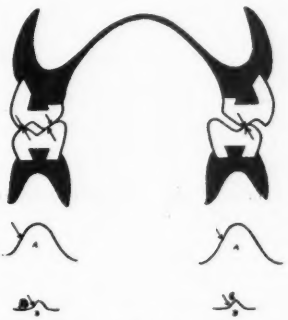

Fig. 16

cause tissue atrophy, but when sufficient change has taken place to relieve that condition, why does the atrophy continue until there is a considerable space between the border of the denture and the tissues? There must be one or more

contributing causes and cusp trauma is one.

## Discussion

*Rupert E. Hall, Chicago, Ill.:* The best form of occlusion possible should be our aim in supplying artificial dentures. We thus increase masticating efficiency as well as minimize trauma to the supporting tissues. You will note that we say "minimize trauma." By this, we mean that trauma to the supporting tissues may be a condition associated with the wearing of a denture in spite of the form of the occlusion. This form of trauma results from the forces of mastication causing torsion of the denture in the directions of least resistance, and these movements are not eliminated with the best of occlusion.

It is the opinion of the speaker that deep cusp teeth properly occluded direct the forces of mastication more vertically and nearer to right angles to the base of the dentures. It follows, therefore, that less movement of the base of the denture occurs on the supporting tissues, and chances for trauma are minimized. No matter how well the dentures are occluded, we cannot dispense with the force of mastication. In case of partial uppers, a type of dentures that we see so much of, the pounding and hammering of the lower teeth in mastication causes a wasting away of the anterior part of the ridge, as we see in a great number of cases. Now, that type of denture is, as a rule, well occluded, because it is done in the mouth and any malocclusion would not be tolerated.

*F. M. Hight, Houston, Texas:* Dr. French asks: Is it not just probable that the principal causes of soreness and tissue atrophy under dentures are the result of cusp trauma? I should answer in the affirmative. Theoretically and logically, we must say yes, but the preponderance of clinical evidence is the best proof we possess. A patient comes in with the lingual border of the lower denture irritating the tissue on one side. Without some knowledge of cusp trauma, one might trim the base at the point of irritation and dismiss the patient, only to have him return again in a few days with the same kind of an irritation at this point or very near it.

The base is trimmed again and again until we are reminded of that ancient advice: "Trim the lower until you think you have ruined it, and then trim it some more." There are thousands of dentures in use today that have been practically ruined so far as masticatory efficiency is concerned, when the reduction of a high cusp with a small carborundum stone opposite the point of irritation would have made the patient comfortable. This movement of the base should not be confused with what might be termed a loose denture, for this irritation often occurs with dentures that are stable.

Another phase of cusp trauma which is often present in the highest type of denture is that produced between the lateral working range and central occlusion. To prevent this, we must have smooth gliding surfaces with the maximum amount of tooth structure in contact, which will tend to equalize the stress on the tissues.

I consider deep cusp teeth the most efficient and for that reason use Mold 133-L almost exclusively. Mold 133-L is put out by the Dentist's Supply Company. It is not ordinarily carried in stock by the dental supply houses, but it can be ordered direct from the Dental Supply Company. It without doubt is the best shaped, best formed, true bite tooth made, and it is not a large tooth. An analysis of the stress on the tissues under a base constructed using this particular mold shows a much greater vertical component. The flat cusp teeth present a surface whose surface friction is transmitted almost entirely to the tissues as a lateral stress, while with the deep bite cusp a much more desirable condition is obtained; namely, minimizing a horizontal or lateral stress, and increasing the vertical. With a deep cusp tooth, one can get more tooth structure in contact; that is, get it quicker and keep it in contact longer before central occlusion is reached, and with shallow cusp teeth, there is less working range, one might say, between the time the teeth come in contact and the time they slide into central occlusion.

Another important and, to me, vital factor that I wish to emphasize is, the necessity of obtaining central occlusion, because this is the first step in preventing cusp trauma and this by the only scientific method with which I am familiar; namely, that given us by Dr. Gysi. His method is the simplest and the only one that is scientific and proves itself to you in the entire work of constructing a set of teeth.

For the man content to use slipshod methods of obtaining central occlusion, the only safe way to avoid cusp trauma is to use a tooth with no cusp at all.

*Dr. Hight:* I want it understood that I measure the inclinations, and they can be set on a machine and followed out in this cusp

arrangement. I am not setting a deep cusp tooth to a flat movement: I am setting it to the movement that a patient has. We can use a deep cusp tooth in a flatter range, as he speaks of it, because we have the opening component. You forget that we have an opening component which permits us to use deep cusp teeth in the same cases you use shallow cusp teeth, using the same inclination measurements at the head of the condyle.

*Walter E. Beyer, Indianapolis, Ind.:* We know that in artificial dentures, the biting stress is reduced to about one-fourth what it is with the natural teeth. The shallow cusp tooth is not a sharp tooth, and it triturates the food like a mortar and pestle; while the deep bite cusp will actually cut the food. Therefore, by using the deep bite cusp, we reduce the danger of trauma to the tissues by reducing the pressure to divide the food.

*W. F. Chappelle, Buffalo, N. Y.:* The question of choice of high cusps and low cusps depends on the manner in which they are to be used. If the patient can limit his bite to a deep cusp, as carniverous animals do, then the high cusp has greater efficiency, but if the patient normally masticated with a wide triturating motion and persists in using dentures similarly, then the lower cusp would be better form, because the relatively flatter triturating motion would clash with a steep cusp. If it were possible to get a patient to change his mandibular movement readily to accommodate the arbitrary cusp angle, he would have a longer excursion during the passage of the entire plane of one tooth over the other, but if the patient will not limit himself, a lateral force is introduced if the movement is wider and longer than the cusp given them. Such discordant or unnatural excursion over those cusps would have a greater displacing action than the coordinate natural movement over a flatter cusp.

*The Chairman:* Dr. Chappelle, if I understand you, you mean that, with the deeper cusp, this angle affords more obstruction than in the flatter cusp, thereby limiting the range?

*Dr. Chappelle:* Yes.

*The Chairman:* And the flatter cusp would give them the full length of the line?

*Dr. Chappelle:* Yes, a wider tooth could be used and a wider range given if desired.

*Dr. Chappelle:* If with dentures, the natural free mandibular movements as to direction and magnitude are allowed, they are so well fixed that there is no chance of using a cusp other than that which the patient can naturally handle, as failure to coordinate cusps and normal masticating excursion will cause discomfort, instability and inefficiency. Therefore, cusp angles should not be arbitrarily chosen. I am an exponent of the adjustable articulator, with coordinated articulation, and of the actual meeting of conditions as found in the patient, without expecting him to endure much change or discomfort, cases requiring definite pathologic treatment excepted.

# OSTEOMYELITIS OF THE MANDIBLE AND MAXILLA

By THEODOR BLUM, D.D.S., M.D., New York City

(Read before the American Society of Oral Surgeons and Exodontists, Cleveland, Ohio, September 6, 1923)

IT may be well to recall that osteomyelitis of the mandible and maxilla may be hematogenous in origin or it may be caused by an infection originating from the teeth or their surrounding tissues. The hematogenous type may develop without any previous acute infectious disease or it may develop a few weeks after such an acute infection. As the condition is rather rare, comparatively speaking, it must suffice to state that the cases run the same course and require similar treatment. Usually, however, in the nonhematogenous variety, the lesion is more extensive and consequently the sequestrum formation is larger. The hematogeous occurs most frequently in children. Of the acute infectious diseases that are occasionally followed by osteomyelitis of the jaws, scarlet fever, measles, chickenpox, influenza, typhoid fever and diphtheria must be mentioned. Whether, in these cases, the previous infection alone is responsible for the osteomyelitis or whether the general lowered resistance paves the way for the bone to be attacked by the usual organisms found in this condition has not been decided.

The majority of all cases of osteomyelitis of the mandible and maxilla are caused by an extension of the infection from a carious tooth, from a gangrenous pulp of an apparently sound tooth, from an alveolus after an extraction, or from a wound reaching the bone or periosteum, as is most commonly seen in fractures of the mandible. Naturally, those cases caused by caries are by far the most common.

An inflammation of the periosteum is called periostitis, of the bone proper osteitis, of the bone marrow osteomyelitis. It is impossible for one of these three structures to be involved without some disturbance taking place in the other two. The terms periostitis and osteomyelitis are the most common. While the acute variety will in a few days become purulent, the chronic variety, called periostitis ossificans, is productive of new bone. As osteomyelitis soon involves the periosteum and surrounding tissues as well, the term periosteo-osteomyelitis would be proper; however, it is not necessary.

It has been previously mentioned that caries is the most prevalent cause of osteomyelitis. Statistics have shown that the frequency curve of the teeth involved ascends from the central incisor to its apex when reaching the first molar and then descends again to the third molar. The mandible is more often involved than the maxilla, the relation being 3 : 2. Although the oral surgeon seldom sees a case in the initial stage, it is known that it usually begins with a pericementitis; then the swelling appears and there is a rise in temperature, which at times is very high and accompanied by chills. The swelling is often noticed as an obliteration of the upper or lower fold of the vestibule when appearing on the buccal or labial side. If pus develops on the lingual side of the mandible, the characteristic swelling of the submental region and immobility of the tongue are always present and the speech will be difficult. The lymph glands become involved, enlarged and sensitive to palpation. In marked cases, a perilymphad-

enitis develops, the submaxillary and submental glands being firmly adherent to the mandible. An infection of the mandibular incisors travels to the submental lymph glands, while infection of any of the other teeth affects the submaxillary glands. Pus developing in the bone pierces the cortical plate, making its way through the point of least resistance, as through the outer plate from the maxillary incisors or into the nose, through the palatal plate from the palatal roots of the maxillary teeth as well as those of the lateral incisors. The antrum becomes involved in those cases in which the proximity of the apex of the teeth invites such a course. On account of the anatomic relation of the first molar, an infection here is the most frequent cause of this complication.

Owing to the fact that the skin is nearer the mandible, and that pus, therefore, does not have to travel so far, and is also probably influenced by gravity, subcutaneous abscesses are mostly seen in the mandible. The anatomic relation of the upper fold of the vestibule readily explains this occurrence.

Trismus will be found in osteomyelitis of the maxilla as well as the mandible, depending on how near the diseased area is to the muscles of mastication and on the extent of their involvement.

While in minor cases the extraction of the responsible teeth may cause resolution of the whole process, the majority of cases will require surgical treatment. This consists chiefly of free drainage and watchful waiting. Wherever pus is found, a surgical incision is made; whenever bone is separating as a sequestrum, it is removed. Argyrol 25 per cent and iodoform gauze are preferred for dressings. Although there is no objection to the removal of the responsible tooth, especially if it is a single rooted and loose; and while a patient may succumb to the disease, not on account of such an extraction, but in spite of it, I still prefer, in the majority of cases, to be satisfied with free drainage by an incision only, if pus is present. After the acute symptoms subside, the removal of such a tooth, possibly under conduction anesthesia, will not only allow the operator to chisel out roots or apices should the tooth fracture, but will also permit him to curet if this is indicated. For infected soft tissues not communicating with the bone or the mouth, surgical solution of chlorinated soda (Dakin's) or similar hypochlorite solutions are indicated. For irrigation of the bone itself, warm physiologic solution of sodium chlorid or boric acid solution, in other words, a bland fluid, should be used and not a highly germicidal agent, since, in my experience employment of the latter has sometimes delayed the process of sequestration. Vaccines should be administered whenever indicated.

As long as the belief is prevalent that lowered resistance has a good deal to do with the development and progress of the disease, it is extremely important to build up this resistance. A fluid diet is prescribed during the acute stages, consisting mainly of fresh fruit juices, such as orange juice and lemonade, as well as milk and eggs in some form. Later on, fresh vegetables and cereals are added.

In rare and selected minor cases, the responsible tooth may be saved by dental treatment and root amputation.

Fistulous tracts, which are found in chronic cases, leading from the focus to the skin, give the sensation of a cord to the palpating finger. The fistulous opening itself may stop discharging and apparently heal entirely, only to open again with new pus formation. The contraction of this cord causes a characteristic pulling in of the mouth of the fistula and the surrounding skin. The true nature of fistulae at the chin originating from mandibular incisors or cuspids has at times not been recognized and they have been treated as conditions arising from the skin, of benign or malignant character. This is due to the fact

that in most of the chin fistulae, the teeth that are responsible are not carious, but their pulps have lost their vitality through trauma. It is only by dental and roentgen-ray examination that the causative factor can be detected. In this connection, a few words may be said about how such an infection through the blood stream could possibly take place. Partsch relates that he has found organisms in these pulps that are never found in the blood. Furthermore, at no time were there ever serious general symptoms present. He wonders whether organisms do not travel toward the pulp through some defect in the enamel. It seems that an infection through the gingival edge and pericementum is more plausible if the blood stream must be excluded.

Osteomyelitis also develops as a complication of severe stomatitis, mercurial stomatitis, noma and scurvy.

Localized ulcerative stomatitis caused by a partly erupted tooth, generally a mandibular third molar (so-called infected wisdom-tooth pocket) is quite important on account of the extension which may develop and affect the pericementum, the periosteum and even the bone proper, and the neighboring lymph glands. There is no limit regarding age, as third molars especially may erupt at any time. Pain is experienced along the bone in the region of the tooth and fetor ex ore and trismus are present. In advanced and serious cases, peritonsillar and pharyngeal abscesses complicate the case. The adjacent lymph nodes are always involved and may become purulent so that an external incision is indicated.

The organisms found are the spirochete and the fusiform bacillus. I do not deem it advisable to cut the flap covering the erupted tooth during the acute stage, but to cleanse the pocket with 25 per cent argyrol on cotton swabs and insert a small strip of iodoform gauze to insure drainage. A hot mouth wash of physiologic solution of sodium chlorid should be used every hour. Fluid diet and a purge are essential. If the tooth is decayed and beyond repair or without function, it should be extracted after the acute symptoms have subsided. If the antagonist biting on the flap is causing the injury, its removal must be considered. A complicating periostitis or osteomyelitis will be treated in the usual manner.

In most cases of osteomyelitis, recovery ensues in due time, even though with the loss of a number of teeth and large portions of bone. The most serious cases are those in which the bone and immediate surrounding tissues are hardly affected at all, and in some cases so slightly that a clinical examination does not disclose anything. Here the defensive powers of the body are utterly unable to cope with the infection, either on account of the virulence of the infection or because of lowered resistance, or both. The organisms and their poisons are carried away by the blood and lymph stream, and their presence gives rise to complications which, in my experience, have always resulted in the death of the patient. Ludwig's angina, a very rare condition, is a severe cellulitis of the tissues of the floor of the mouth. In spite of extensive free drainage, medication, etc., the patient will succumb in a few days. Those cases that show a fair amount of pus on incision are erroneously termed Ludwig's angina. They are, as a rule, abscesses developing either subperiosteally or after the breaking down of a lymph gland. It is characteristic of the cases of angina that, on incision, a very small quantity of pus, if any, is found; generally, a turbid serous fluid of extremely bad odor is noticed, and at times the gas bacillus is present. Another complication is thrombosis of the cavernous sinus, which, in all the five cases under my observation, originated from a focus in the mandible, four after extractions and one after pulp capping of a first molar. Edema of the eyelids and orbit, with a protrusion of the eyeball

and other eye symptoms, and the markedly low general condition of the patient are the outstanding symptoms.

As a rule, the differential diagnosis in osteomyelitis is simple. A few years ago, a central sarcoma of the mandible came under my observation. On account of looseness of the teeth, marked intraoral and extraoral swelling and softness of the tissues, which was mistaken for fluctuation, the dentist in charge made the diagnosis of chronic osteomyelitis and instituted treatment accordingly. Such interference with malignant neoplasm hastens its extension and deprives the patient of the possibility of recovery. Even repeated palpation of a cancerous growth has been shown to cause metastasis (Bloodgood).

Of the specific inflammations of the jaws, tuberculosis and syphilis are the most important. In certain parts of the United States, actinomycosis occurs. It must suffice to say that it is caused by the ray fungus, which is easily detected by microscopic examination. Tuberculosis of the jaw may extend to the bone through a lesion of the mucosa or enter through the pulp of a carious tooth, causing osteomyelitis of tuberculous nature; while, on the other hand, an ordinary osteomyelitis may become tuberculous through a secondary infection. Of course, tuberculosis may develop in the jaw bone as in any other bone of the body, the point of predilection being the infraorbital border of the maxilla. Extremely chronic and mild infection, as well as a simultaneous presence of dactylitis, is characteristic.

Only tertiary syphilis of the jaw bones is found, and then most commonly in the maxilla. Gumma of the hard palate extends either downward or in the opposite direction, into the nose. It must be remembered that in about 15 per cent of tertiary bone lesions, the Wasserman examination is negative. The examination of the spinal fluid and a provocative Wasserman test are indicated, and specific treatment should be instituted. Syphilitic hyperostosis may be the cause of trigeminal neuralgia.

During the last winter, two cases of phosphorus necrosis came under my observation. In this connection, mention must be made that it is the white and yellow phosphorus that are responsible and not the red. According to authorities on this subject, phosphorus osteomyelitis, or, as it is called, phosphorus necrosis of the jaws, is phosphorus poisoning plus infection.[1]

This résumé of the subject was written mainly to emphasize one point, namely, where the responsibility lies in the majority of these cases of osteomyelitis: whether it is lack of knowledge or neglect on the part of the general medical or dental practitioner or of the specialist. Can the profession be satisfied with the usual explanation of lowered resistance of the patient? It is true that thousands of injections are given properly and improperly, thousands of teeth are extracted with sterile and unsterile instruments, with or without the necessary knowledge of the operation and after-treatment; still, only rarely, comparatively speaking, does an infection of the bone develop. However, I have seen a number of cases in which neglect on the part of the operator was at least suspected, or lack of knowledge was quite apparent. What remedy can be offered? The schools must pay more attention to the teaching of minor oral surgery, which should include considerable practical experience. The recent graduate should be compelled by law to practice at least one year under supervision, and no one should be permitted to practice any surgical specialty of dentistry without having been prepared in some way for such work and without giving some account of his or her ability to the authorities.

140 West Fifty-Seventh Street

1. During the Fall of 1923, there came under my observation a case of osteomyelitis of the mandible and maxilla, somewhat similar to phosphorus necrosis; which, however, was caused by some radioactive substance used in the manufacture of luminous dials for watches. The condition has been termed "radium jaw."

# ORAL DIAGNOSIS

By HAIDEE WEEKS GUTHERIE, D.D.S., New Orleans, Louisiana

(Read before the Chicago Dental Society, Chicago, Illinois, January 17-19, 1924)

DENTISTRY has indeed advanced far since its beginnings, where the dentist was one who through a technic based largely on physical strength occupied himself with extractions as a "side-line" to some other vocation. No longer is the dentist a blacksmith, a barber or a watchmaker who has developed a particular facility for dental operations. We have seen dentistry grow to a specialty of medicine and, like some other specialties of medicine, further develop its own specialties. The establishment of these marks of progress has been made possible as the profession has seen fit to make use of researches in anatomy, physiology, bacteriology and pathology which have been contributed to the science of medicine.

Never before has there been such a call on the dentist for help in medicine as there is today. To the honor of our profession today be it said that never before have we been able to give this help so efficiently. The physician is becoming acquainted with the work of our masters, and we dentists are becoming more alive to the medical aspect of the work we do.

One of the dangers which confronts everyone in a specialty is that he comes to see only the special field in which he works and forgets for the moment its relationship to the patient. Mouth conditions must be viewed in respect to the influence on general health and in respect to the effect of general health on them.

Our responsibility grows as the demands of general medical and surgical diagnosis are increased. In this field, as in other fields in medicine, a large part of our effort can be properly directed to diagnosis. Students of medicine sometimes are heard to complain that too much attention is paid to the diagnosis of disease and too little to treatment. They do not realize, in their inexperience, that while reference books may teach them therapeutics, diagnostic skill can be achieved only by years of experience and personal observation, based upon thousands of routine examinations and systematically kept records. Oral diagnosis is a specialty of dentistry today.

The oral diagnostician has most of his cases in consultation with the specialists of medicine. Before we can begin to make any kind of diagnosis, the most careful examination should be made. The charts used by the New Orleans Child Welfare allow us to systematize and minimize our summary of the existing conditions found. The general condition and oral condition of the child are nearly always interdependent.

In examining the mouth of the infant, we should look at the region where, according to age, the tooth should erupt. We should look for lesions of the mucous membrane; and for abnormality of the

frenum. As the older child walks into the room, we judge his size, hair, complexion, eyes, nose, shape of the face, stature, carriage, etc., and record all abnormalities observed. When he gets into the chair, we have gathered a fair impression as to his mental and physical condition. We ascertain his age, weight, previous illnesses. The facts as to whether or not he is a "repeater" in school, and whether as an infant he was breast-fed or bottle-fed are next determined. The results of examinations of the lymphatic glands and lip conditions are next noted. He is made to swallow, breathe, open and close the mouth, and move the jaws laterally; and the findings are recorded. A crackling sound due to an abscessed condition in the deciduous molars sometimes occurs, and is worth looking for.

The tonsillar conditions are now noted. The appearance of the pharynx and the soft tissues of the mouth is recorded also. The existence of abnormal frenums is of course observed. Sinuses and pockets are looked for. The periodontal membrane is now examined for pathologic conditions.

Next, we observe the number of permanent teeth erupted; the number of vital and nonvital teeth, and the number of missing teeth. If there is malocclusion, Angle's classification of malocclusion is used. Cavities in permanent and deciduous teeth are noted.

Faulty nutrition, undue density of the overlying tissues or other complicating circumstances may interfere with the process of dentition. We may occasionally encounter complications that may even endanger the life of the infant.

The indications of teething are an increased flow of saliva due to an irritation of a branch of the fifth nerve, which supplies the salivary glands; Nature's method of irrigating and cooling the inflamed area. Mucous cheek eruptions are prevalent which are probably reflex in origin, causing the child to be wakeful and restless. If several delayed teeth are erupting at the same time, and the consequent conditions are severe, we may have colic and convulsions in a highly nervous child. Miller found the usual bacteria that cause infant diarrhea in the mouth at this time.

In examinations of children's mouths, we frequently see small vesicles about 2 mm. in diameter surrounded by a reddened zone. These vesicles soon rupture, forming herpetic ulcers with grayish bases and bright red margins. The ulcers are sunk into the tissues, and the slightly indurated margins stand up above the surrounding areas. They most frequently occur on the margins of the tongue and the inner surface of the lip and cheek. These conditions are usually associated with attacks of nervous indigestion. Children often refuse food on account of pain.

Thrush, or parasitic stomatitis, seen on the mucous membrane in very young children is caused by *Oidium albicans* belong to the yeast family and presenting branching mycelia. It rapidly develops in unclean mouths, especially when catarrhal conditions of the mucous membranes are present and acid fermentation of food is permitted to occur. It attacks the tongue first, then rapidly spreads to all mucous surfaces and appears as slightly raised, pearly white spots, which gradually enlarge and coalesce.

An abnormal lingual frenum may cause fretting and difficulty in nursing, not allowing the infant to use the tongue in swallowing. It is necessary that the labial frenum be removed as it is one of the causes of malocclusion as well as a cause of pyorrhea in later years.

The child should be brought to the dentist the second year, as the care of the deciduous teeth is of prime importance in facial contour. If the child is brought early, no painful operations are necessary, as a rule, and the dread of the dental chair is not instilled in

him. As he grows older, he can be taught prophylactic measures that will materially aid him in the care of his teeth.

### Syphilis

In the examination of the patient, we are able to make the diagnosis by classification of conditions. Abnormalities of size, shape and color of either the deciduous or the permanent teeth, or of both, may point with directness to the existence of serious general disease at some period previous to the eruption of the tooth. It is often a matter of considerable surprise to the pediatrician to get this information first from the dentist. It frequently happens that the parent has overlooked this factor in giving the child's history to the medical man.

In my experience, retarded absorption of the deciduous roots is one of the most important diagnostic factors encountered in the mouth of the child. The explanation of the cause is this: the area in which it exists or the time when it is found very often points the way to a positive conclusion regarding a vital abnormality existing in the child's general health.

Whenever delayed absorption is seen, a roentgenogram should be made. A positive Wassermann reaction may be of great help here in confirming a diagnosis of hereditary syphilis. However, after years of experience, I place much more reliance in conditions as I see them in the child's mouth than on the laboratory findings. In no department of medicine, not even excepting dermatology, are the indications of existing syphilis more positive. It is to the dentist that these patients come before consulting a physician, and it is imperative that he, too, be on his guard as to the existence of syphilis in the patient. In numbers of cases in which the positive diagnosis was easily made by examination of the mouth, clinical signs and laboratory findings were lacking.

The typical picture of a child with a pasty complexion, coarse dry hair, and "saddle nose," who is indifferent to his surroundings and stunted in growth and intellect would, of course be recognized by a practitioner, as a patient suffering, in all probability, with hereditary syphilis. His lymphatic glands may be enlarged, all or just one group of glands. On opening the mouth, the ducts are functioning; the opening and closing of the jaw are normal. The lower anterior teeth are even, slatlike teeth with the spaces between the teeth as wide or wider than the mesiodistal width of the teeth. An upper labial frenum and boxlike upper anteriors are seen. As a rule, in cases of this type, the deciduous molars are large well-shaped teeth. The first permanent molars are in position, and a marked fifth cusp on the lingual of the upper permanent molars is seen. The tongue is very red with deep fissures, but in some cases may not be changed at all. In most cases, it is thicker and shows the imprint of the teeth on its edges. Many folds and furrows transverse the surface of the tongue; which gives it either a flattened form, or, at the edges, a pulled out and fringed appearance. The most important and characteristic symptom is a thickening of the epithelium. These thickened epithelial spots, as they spread, assume ring and bow-shaped forms which have a more or less bright red center, sometimes very smooth. Sometimes these plaques are raised above the normal mucous membrane and are a yellowish gray. Rapid change is particularly characteristic of this condition. Sometimes, the rings grow and assume other shapes. Sometimes, they disappear for a while. The aspect of the tongue is never normal. These rapid changes in shape and form are more marked in the younger child. The condition lasts during life. When we see a condition of this kind, we ask for a Wassermann test. It may or may not be positive. A simple geographic

tongue with no other evidence is not a sufficient indication of syphilis. To determine the presence of this condition, we must seek farther.

This case may be of interest:

A boy of 8 years, of normal height, weight, eyes, complexion, stature and carriage, was found, on examination of his mouth, to have normal lips, glands and tissues. His hair had streaks of gray; a slight degree of "saddle nose" was present, and the lower right lateral and cuspid were fused. The maternal grandmother was mentally deficient; the mother, who had white hair at 18, was nervous and complained of bone pains. A diagnosis of arthritis of the spine had been made by the family physician. The child's deciduous teeth had never been sufficiently absorbed, so that they could be easily extracted. A Wassermann test was positive. Wassermanns made on other members of the family were negative. However, the mother was given specific treatment for syphilis, and the arthritis entirely disappeared.

In eleven cases of fused teeth, ten were of the lower anteriors. Only one was of the upper anterior. Of the eleven patients showing fused teeth, nine were proved to be syphilitic. In seven of the cases, bone involvement was evident; as were clubfeet, "growing pains," arthritis and hip disease. Mental deficiency was frequently found.

In one patient, mentally defective, there are now five lower incisors. After specific treatment, the child is becoming normal in point of intelligence.

Fused teeth occur quite frequently in the cases which present unmistakable signs of syphilitic disease, and I am impressed with the fact that in our records this anomaly occurs usually on the right side and seems to be confined to the lower lateral and cuspid. We have no explanation to offer for this phenomenon and mention it only in passing. The frequency with which we have seen fused teeth in syphilitic children inclines us to consider them as a sign of no insignificant value in summing up the diagnostic points in a given case. In the cases of fused teeth, there are nearly always other abnormalities and malocclusion. If the malocclusion is not noticeable in the deciduous denture, it most probably will develop later.

It is most important, in the cases of malocclusion which require treatment, to examine the patient for evidences of hereditary syphilis. No matter how well planned from a mechanical standpoint is the effort at restoration, failure will most likely occur through lack of retention. The teeth may be brought into approximately correct position with skilful hands and patience; but the result will not be permanent because of the fact that the looked for retention fails, and the teeth return to the faulty position.

Whenever this occurs, it is imperative to look for evidences of syphilis in the mouth and to refer the patient for proper treatment. Indeed, it cannot be too strongly emphasized that the dentist sees perhaps the most positive evidences of hereditary syphilis that are presented in any field of medicine, and he must learn to recognize these signs as they appear. This necessity is so obvious that further comment on this point seems useless. An orthodontist may save himself mortification by learning to recognize hereditary syphilis when it is manifested in the mouth, refusing to undertake orthodontia until treatment of the disease is, at least, well under way. Again, must we insist on diagnosis as the fundamental fact in all medical and surgical undertakings.

Many children from 7 to 8 years will come in with the four lower incisors and upper centrals erupted. Around the lower laterals that have erupted out of alinement, we will find the gingivae swollen, red and spongy. The child has been referred by a pediatrician because she is undersized and underweight. In the mouth, with this condition existing, we find an average of five cavities in the deciduous molars. The periodontal membrane and gingivae in the region of the deciduous molars is covered with débris, swollen, and bleeding on slight

pressure. The child's soft tissues are inflamed and the effort to masticate causes pain and, in consequence, the loss of appetite. The child is given a toothbrush drill; the teeth are scaled, and the cavities are filled. She is then referred to the orthodontist for correction of the malocclusion. The tissue around the laterals will become normal, and the child will quickly gain and become normal in intellect and weight. The pus conditions seen in the gingivae of many children are the result of trauma due to malocclusion.

### Scurvy

Patients between the ages of 2 and 6 often show a hemorrhagic gingivitis. The gums are swollen and bleed easily, and at times cover the teeth. Ulceration about the necks of the teeth, with a dark bluish ulceration on the tissue overlying roots of decayed teeth, is seen. Frequent hemorrhages from the mouth and nose are noted. The patient often will be carried by the mother and placed in the chair, or will limp into the office. There will be noticed a swelling of the large joints, especially about the knee and ankle, a marked pallor and flabby muscles. There is always a history of bad feeding, and usually a lack of diversification of food. The symptoms are immediately improved by antiscorbutic diet, orange juice and a thorough cleaning of the mouth. At the first examination, we remove all roots and necrotic tissue, and refer the child to the physician for a general medical diagnosis.

### White Decay

Many of us see in children the recurrence of decay, which is sometimes most discouraging. A child will return in from eight to ten weeks with two or more cavities, or the enamel is frequently soft enough to be removed with a spoon. We have noted that the saliva in these cases is nearly always viscid. In sixteen cases of white decay, eleven were associated with hypothyroidism. One patient had no eyelashes nor eyebrows. On the other hand, one was 6 inches taller than normal, and her permanent teeth erupted four years earlier than normal. This child is seen once a month. Her father, who is a physician, is, of course, quite concerned over her condition. She has had the same food, care and attention as the five other children in the family, and yet the softening of the tooth structure is not found in any other member of the family.

This white decay is similar to that we often find in the pregnant woman on the gingival thirds, and in partially erupted third molars. Nursing mothers also at times present these white lines at the gingival margin.

### Pyelitis

In thirty-six cases of children suffering from pyelitis referred to me, ranging from 2 to 6 years, we found that thirty had at least two abscessed teeth with necrosis. Two had to have all teeth removed except the first molars. One of the two finally died of starvation.

In the thirty-six cases, only five had no pathologic oral conditions, except that one of the five had the lower lateral and cuspid fused, and although the Wassermann was negative, the family history was poor. The father had died from a gumma of the brain.

### Green Stain

Many children from 16 months to 9 years will come in with a green stain on the gingivae.

In mouths in which no toothbrush has been used, we will find a heavy mosslike covering extending from the gingivae toward the incisal edge of the teeth, with the darkest olive stain toward the gingival margin. By an application of a disclosing solution, the iodin reaction will show the amount of starch in the débris covering the teeth. After scaling, we may cleanse the teeth of everything but the green stain. In cases in which the toothbrush has been used, and in which we find no débris on the teeth, we may still find the green stain. The stain is

no indication of an unclean or an ill-kept mouth. We find it as a well-defined thin line on the buccal, labial and lingual surfaces on the uppers as well as the lowers. It has been found in families of six children ranging in age from 2 years to 12 years, and in the father and mother of the family.

The green stain is also found in the mouths of children who have pyelitis. We have never seen a case of pyelitis without the green stain. The green stain is found in the mouths of adults who have well kept mouths, and are apparently in good health. We have never found the stain on artificial dentures, as we often find calculus.

We will find that the child who has the stain has not had a balanced diet. If the small child is being given, say the juice of one-half orange a day, twice the amount of orange juice will probably prevent the stain. If the older child takes the juice of one orange a day, that of two oranges will prevent the stain.

In my tests of more than 300 cases showing green stain, in both children and adults, 95 per cent of the patients could not differentiate between bitter and acid. A child or an adult will not eat or drink something which is distasteful to him. One of my patients on whom I was making these tests told me that he never ate salad. He could not sit at a table if there was vinegar on the table, it being so distasteful to him as to be nauseating. He could not eat a lemon or an orange. He could not differentiate between quinin and lemon juice. In the children, the acid is bad tasting and so is quinin, and they cannot make the distinction between sour and bitter. Mothers will say that the baby "spits up" the spoonful of orange juice, but takes the prune juice readily.

Patients in whom we find the green stain usually have a periodontal membrane that is red and spongy, and, as a rule, there is a susceptibility to ulcerative stomatitis. If we make tests in the case of a man who had trench mouth in France, and who still has a moderate degree of ulcerative stomatitis, we find that the green stain is there in association with a lack of vitamin C in the diet, and with a distaste for acids—inability to tell acid from bitter.

As regards ulcerative stomatitis, the juice of one orange, or 2 ounces of orange juice, three times a day, will many times clear up the condition in forty-eight hours. At two of our colleges, there are a number of patients who at midterm and final examinations always develop an ulcerative stomatitis, which is cured by orange juice.

### Prevention

In each case which comes to us, we should ask ourselves, If this child were ours, what could we have done to prevent the conditions we find? the carious teeth, the poorly formed teeth, the atrophic conditions of the first molars, the striations on the incisors, or, the tremendous susceptibility of the teeth to decay? All these are real problems which can be solved only by observation and tabulation of large numbers of similar conditions.

Prevention begins with the pregnant mother. She must be seen every six weeks during the months of pregnancy and her mouth must be kept clean. We insist on a well-balanced diet. With this necessity emphasized to the mother, she will keep up her own oral hygiene and teach it to the child. Never in my practice, either in my clinics or in my private practice, have I ever had a patient say anything but encouraging things about oral hygiene at the time of pregnancy. About 60 per cent experience freedom from nausea when under care, and with a clean mouth.

New patients are brought for observation at as early as 6 weeks of age "to see that everything is as it should be." We must not allow the mother to let the

child suck its tongue, its fingers or a pacifier.

Statistics have shown that the most prevalent of all human diseases is dental caries, 95 per cent of our school children being thus afflicted. These figures show also the systemic effects of caries on teeth, one of the most important units of the digestive apparatus. Impairment means that preparation of the food for digestion is impossible, and the lack of mastication and the bolting of food result in digestive disorders and malnutrition.

In carious teeth, we find harbors for the incubation and proliferation of bacteria.

In cases in which we have chronic abscesses and pyorrhea pockets, we may have arthritis, endocarditis, neuritis, nephritis, and other more or less grave systemic disturbances. If home care is properly given and proper instructions as to diet and prophylaxis are carried out, nearly 80 per cent of dental defects may be prevented.

No one can go safely without an examination for longer than three months, depending on the susceptibility and immunity of the patient to caries, and also on the mentality of the patient, as to how often he should return for instruction and examination, and, of course, any necessary work. Our aim should be to prevent the recurrence of caries. It is our only hope for the future. The demands on us are greater each day. The more we educate the laity, the greater the demands on us; and the higher our educational standards for us as dentists, the fewer dentists we will graduate for the next few years.

So, my solution in preventive dentistry is:

1. To begin with the pregnant mother, preparing her to give to the offspring a good healthy mouth and teeth.

2. To teach her that oral hygiene should begin with the child at birth.

3. To give the child a balanced diet and proper mouth hygiene. The saying "Clean teeth do not decay" is nearly always true.

4. To teach the child that the gums should be brushed as well as the teeth, and should be able to stand as much friction as the palm of the hand.

5. To carry out periodic dental inspection every three months.

6. To give systematic instruction and attention to the child of the preschool age.

7. To emphasize tooth cleaning.

8. To make dental repairs.

If these instructions are carried out, we will help the public as well as ourselves in limiting the reparative work necessary later on.

This preventive work is much more easily done in institutions and community clinics than in private practice. It is in the organization of community dental clinics, and in cooperation with our welfare nurses, that we have excellent results in oral hygiene. My first test in prevention was in our day nursery where I took fifty children between the ages of 2 and 4 years, and after systematic care for two years, there was not a cavity.

For the prevention of the 95 per cent diseased teeth in our school children, we must have community dental service. We cannot, in our private practice, do one-tenth of the work we can do in the clinics. We reach masses in our clinics, while in our private practice we merely reach individuals. It is in the masses that we must relieve and prevent.

# TRAUMA PRODUCED BY OCCLUSION, DUE TO HORIZONTAL STRESS

By CARL J. GROVE, D.D.S., Ph.G., F.A.C.D., St. Paul, Minnesota

(Read before the Chicago Dental Society, May 20, 1924)

THE average dental practitioner seems to be under the impression that perpendicular stress in occlusion produces trauma resulting in infection. It is my opinion that horizontal stress caused by lost occlusal anatomy produces the injury primarily responsible for these infections.

Figure 1 is a diagram of an upper and lower molar in occlusion. It may be noted that the lingual cusp of the upper molar has a buccal inclination of about 3 mm. The position of this cusp causes the force exerted in mastication to act in the direction of the long axis of the tooth. Owing to the position of the cusp, force is also exerted in the direction of the long axis of the lower molar, shown at *A*. It may be noted also that the lower molar has a lingual inclination, of about 3 mm., causing the force exerted to act in the direction of the long axes of both the upper and lower molars as indicated at *AAA*.

The fibers of the periodontal membrane bear the stress of occlusion and injury of these fibers produces disease of the investing tissue.

Figure 2, a photomicrograph of a portion of a longitudinal section, shows the tooth structure, dentin at *A*, cementum at *B*, periodontal membrane at *C* and bone at *D*. The fibers of the membrane that bear this stress run at right angles to the tooth, and are attached to the bone on one side and to the cementum on the other side. The lamella of dense bone may be noted at *E*. This bone is very dense in order that it may furnish secure attachment for the fibers of the membrane. The layers of bone are sometimes referred to as the lamina dura. When infection results from traumatic injury, a destruction of the fibers occurs, followed by absorption of the bone.

Figure 3 illustrates the direction of normal occlusal force and shows in an exaggerated manner the fibers of the membrane, running at right angles to the tooth at *CCCC*. When stress is exerted in the line of the long axis of the tooth, all of these fibers are brought into tension, bearing the force exerted. In other words, the pressure is equally distributed to all of these fibers. It can be safely assumed that such pressure will not produce injury to the membrane, since the function of these fibers is to support the normal force required in mastication, and surely a sufficient number of fibers are supplied to withstand the stress exerted. Injury follows, I believe, only when the force is not in line with the long axis of the tooth. When force is exerted in a horizontal direction, as occurs when the occlusal surface is worn, only the fibers on one side of the root bear the entire stress. In fact, less than half of the attached fibers bear the stress.

Whenever the cusps are destroyed by wear, as shown in Figure 4, the direction of occlusal force is not exerted altogether in the direction of the long axes of the tooth, but assumes a horizontal direction. If the force is exerted at a point buccally or lingually to the center of gravity, or, in other words, if force is exerted buccally or lingually to the position formally occupied by the occluding portion of the cusps, a rocking motion toward the buccal or the lingual is created, due to the leverage resulting from worn occlusal surface.

Fig. 1.—Upper and lower molar in occlusion.

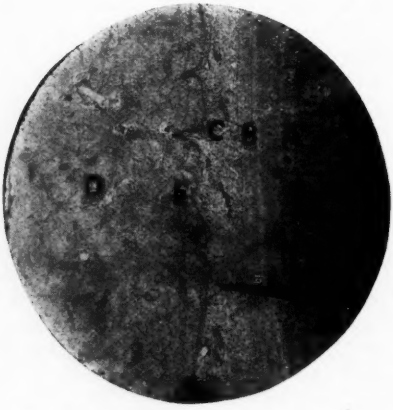


Fig. 2.—Photomicrograph of a portion of a longitudinal section, showing the tooth structure; *A*, dentin; *B*, cementum; *C*, periodontal membrane; *D*, bone.

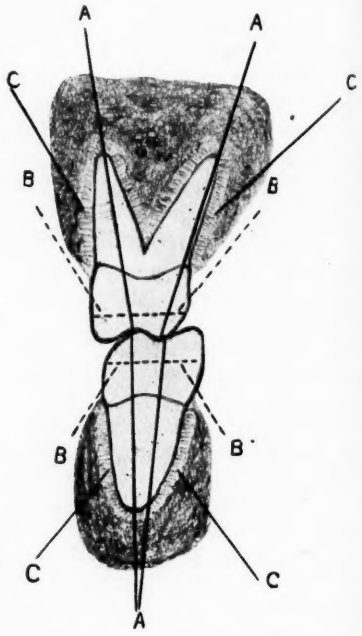


Fig. 3.—Direction of normal occlusal force; *AAA*, line of force in normal occlusion; *BBB*, the point of force when the occlusal surface is worn down; *CCCC*, fibers of periodontal membrane.

The occlusion of the upper and lower molar in Figure 5 illustrates the horizontal line of force caused by a worn occlusal surface. While stress is exerted on the occlusal surface, it is not within the center of gravity; therefore, the force tends to move the teeth in

a horizontal direction. Pressure in a lateral direction creates a tension of the fibers on one side of the root. At *A*, these fibers bear the force, while the fibers on the other side are in compression. The force causing the tension tends to break or tear the fibers and the fibers in compression are crushed between the root and the bone. Either form of injury may result in infection. The fibers on the mesial or distal surface of the root do not come into play except when excessive movement of the tooth occurs.

Fig. 4.—Cusps destroyed by wear. The direction of occlusal force is not exerted altogether in the direction of the long axis of the tooth, but assumes a horizontal direction.

When a morsel of food is placed between pointed cusps, the food is broken with comparative ease, requiring but little stress, which causes only a slight wear of the cusps. Only the required force is exerted in mastication. With a worn occlusal surface, more force is required to crush the food; therefore, more stress is necessarily exerted. It is not, however, increased perpendicular force that causes the primary injury, but increased force exerted in a horizontal direction, made possible by the broad occlusal surface.

The average width of the first upper molar buccolingually at its widest convexity is about 10.5 mm. The average distance from the buccal to the lingual cusp of the first upper molar is about 6.5 mm., which is the widest range possible in a buccolingual occlusion; but when the cusps are destroyed by wear, the area of occlusion is increased to 10.5 mm., making possible the horizontal force already mentioned. The increase in occlusal area calls for increased force in mastication. Since more force is required to crush food with a flat surface, greater force will naturally be exerted. This increased stress is a factor in the production of trauma because horizontal force always exists when cusps are badly worn. There are also other forms of occlusal wear that cause trauma, such as wearing of deep grooves in the center of the occlusal surface, permitting a locking of the cusps and producing a lateral stress, thus placing all the force on the

Fig. 5.—Occlusion of the upper and lower molar, illustrating the horizontal line of force caused by a worn occlusal surface.

fibers of one side of the root and compressing the fibers on the other side.

It is, I believe, agreed by everyone that pyorrhea usually begins at the gingival margin. Since the gingival fibers are nearest the point of the horizontal force exerted, they naturally receive the greatest stress and therefore would be the first to be injured. If perpendicular force causes trauma, infection might occur on any part of the root as perpendicular force is equally distributed to all the supporting fibers.

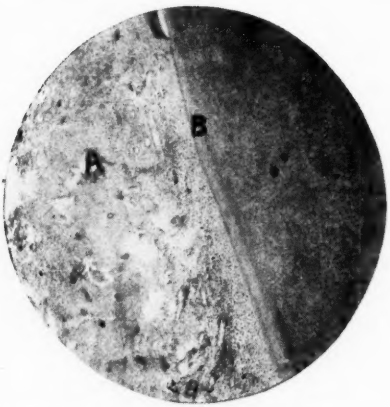


Fig. 6.—Photomicrograph: Experimental production of stress in a horizontal direction; *A*, fibers detached from bone. The lamina dura is no longer present. Absorption of the bone has occurred, but leaving the fibers attached to the cementum, *B*.

In an experimental case in which a gold crown was placed on a dog's tooth to produce stress in a horizontal direction, I found that the gingival was the first tissue injured. As is shown at *A* in Figure 6, the fibers are detached from the bone. The lamina dura is no longer present, as absorption of this bone has occurred, leaving the fibers attached to the cementum at *B*.

A detachment of the gingival fibers of the membrane, either from the cementum or from the bone, increases the leverage, as the position of the fulcrum is transferred to a point in the direction of the apex. In a progressive destruction of the membrane from traumatic injury or from infection, which would be toward the apex, a still greater leverage results. It is obvious that when the leverage is increased, the traumatic injury is greatly increased. Owing to lowered resistance of the tissue produced by such injury, infection causes a rapid destruction of these investing tissues. At this stage, the disease usually manifests itself to the patient. A mistake often made by the dental practitioner is that of treating the disease as an infection only. During certain stages of these infections, continuous medicinal treatment is beneficial, but when the line of occlusal stress is not corrected detaching of the fibers of the membrane continues, regardless of the form of treatment employed. Neither surgical or medical treatment will serve in such cases until the line of occlusal force is corrected. I do not wish to imply that, when the line of stress is corrected, a complete cure of this disease will follow regardless of the extent of bone destruction, but I wish to state that better results will be obtained if a correction of the line of occlusal force is made.

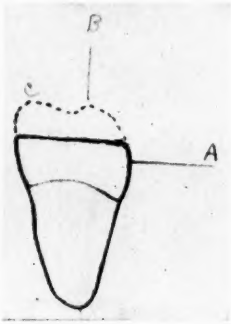


Fig. 7.—Lower molar with the occlusal surface worn flat.

By correcting the line of force, I do not mean merely relieving stress by grinding down the entire occlusal surface of the affected teeth. This will give only temporary relief. I have already stated that horizontal force is a result of loss of cusps, which leaves a broad occlusal surface, permitting occlusion at a point buccally or lingually to the original point of occlusal contact. The restoration of occlusion is the important thing to bear in mind, and to accomplish this, one must know the position of the original cusps.

Fig. 8.—Area to be ground (indicated by lines) to prevent occlusal contact when restoration of the occlusal surface does not seem advisable.

The normal position of the buccal cusp of a lower first molar is about 3.5 mm. lingually from the extreme convexity of the buccal surface. In Figure 7, a diagram of a lower molar with the occlusal surface worn flat, *A* is the widest point of the lingual surface and *B* is 3 mm. lingually from the widest convexity, which is the occlusal point of the molar. Six and five-tenths millimeters from the point of the buccal cusp toward the lingual is the lingual cusp, at *C*. The dotted line represents the restoration. The height of the restoration is obtained from the average height of the crown of these teeth, 8 mm.

If for any reason a restoration of the occlusal surface does not seem advisable, a slant of 3 mm. should be ground on the lingual of the upper molars to prevent occlusal contact at the extreme lingual point. The buccal surface should be ground in the same manner with a groove between these cusps, as shown in Figure 8, by the lines on the occlusal surface.

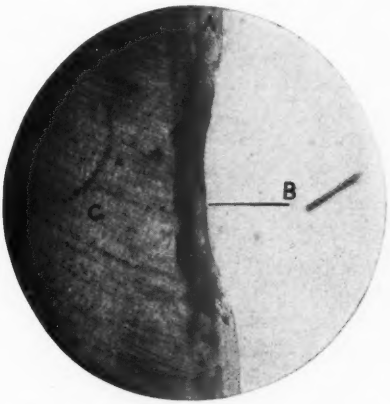


Fig. 9.—Photomicrograph, showing process of repair, when infection has not occurred; *A*, old cementum; *B*, new cementum; *C*, dentin.

Time will not permit presentation of a complete method for the correction of all these conditions. I wish to state, however, that the proper line of force must be restored to all the teeth of the arch if satisfactory results are to be expected.

The lack of proper occlusion in crown and bridge construction, as well as in other forms of restorations, clearly indicates that the importance of this form of stress is not sufficiently recognized. It is true that these restorations often have cusps that articulate with the opposing teeth, but in only a small percentage of these cases is there a cusp form that will

maintain the proper line of force in occlusion.

In cases in which infection has not occurred, repair takes place by a reattachment of the fibers of the membrane to the cementum. I do not mean to say that deep pockets will be entirely obliterated by a reattachment of the tissues to the root, but I do believe that some reattachment occurs in favorable cases when the line of stress is corrected, provided the tooth has a vital pulp. First, the absorption of the cementum occurs

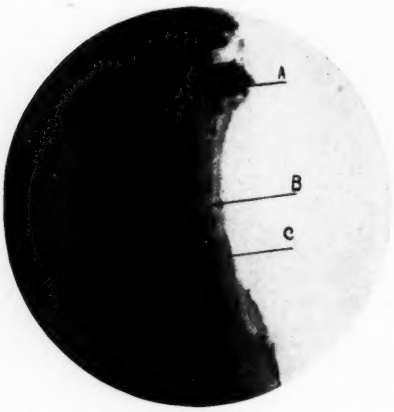


Fig. 10.—Photomicrograph: absorption of cementum in pulpless teeth; *A*, cementum; *B*, area of absorption.

at the point of repair. This is followed by a deposit of new cementum, to which fibers become attached. This is clearly illustrated in Figure 9. Old cementum is shown at *A*, new cementum at *B* and dentin at *C*.

Such repair never occurs in pulpless teeth. Absorption of the cementum may take place as is shown in Figure 10 (cementum, *A;* area of absorption, *B*). I do not believe new cementum is ever deposited in contact with dead dentin. As a result of the absorption of cementum, infection may follow as is shown in Figure 11 at *A* and Figure 12 at *AA*, abscess on surface of root. Both of these teeth were pulpless.

Fig. 11.—Infection resulting from absorption of cementum in a pulpless tooth; *A*, abscess on surface of root.

It has been stated that pyorrhea is an infection of the periodontal membrane.

Fig. 12.—Infection resulting from absorption of cementum in a pulpless tooth; *AA*, abscess on surface of root.

It is not only a disease of the membrane: the infection may extend far into the bone, causing a destruction of the med-

ulla, as can be seen in Figure 13. A portion of the root is shown at *A*, periodontal membrane at *B*, bone at *C*, medulla completely destroyed at *D*. The pus discharging from these pockets comes largely from the bone.

Fig. 13.—Photomicrograph, showing pyorrhea infection extending far into the bone, causing destruction of the medulla; *A*, portion of root; *B*, periodontal membrane; *C*, bone; *D*, medulla.

In conclusion, I should like to discuss briefly the so-called serumal tartar, not as a primary factor in the production of pyorrhea, but as a result of the disease. Tartar is formed as rapidly as the membrane is destroyed. It is my opinion that the fibers of a low state of vitality serve as a matrix for the deposit of these salts. In decomposition of the membrane, acids are formed as by-products. These acids unite chemically with the calcium salts of the blood stream. It is possible for the fatty acids to unite with lime salts to form insoluble soap, and with other acids, such as carbonic acid, to form insoluble carbonates. Contact of this tartar with adjacent tissue, results in irritation with further destruction of tissue and with additional precipitation of lime salts on the surface of the root; thus, the whole surface may be covered with a deposit. My reason for assuming that the membrane serves as a matrix is that, in dissolving this tartar, I have found that inorganic material remains which is, I believe, periodontal membrane fiber.

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# BALANCED OCCLUSION AND ITS RELATION TO PARTIAL DENTURE CONSTRUCTION

By J. W. NEEDLES, A.M., M.D., D.D.S., Pueblo, Colorado

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

OCCLUSION means contact of the upper and lower teeth in any of the many possible positions. The most important of these are central occlusion, protruded occlusion and right and left lateral occlusion. For a balanced occlusion, there must be enough points of contact to result in stable equilibrium. This necessitates at least three points of contact, so arranged as to give mechanical stability. To avoid traumatism, the stress of occlusion must have a direction and distribution that does not exceed the tolerance of the supporting tissues at any point.

The term articulation is used in two senses: the first meaning the movement of the condyles in relation to the glenoid fossae; the second, the gliding of the cusps on their antagonists in moving from one occlusal position to another. In mastication, the jaw moves from lateral to central occlusion in a smooth, uninterrupted path. The cusps of the working side are intermeshed and exert an even pressure on the mesial and distal slopes of each cusp. There is a balancing contact in the molar region of the opposite side throughout the whole of the movement. The condyle of the balancing side also maintains a continuous gliding contact with the articular eminence. There are no interfering points in the occlusion and none of the articulating surfaces lose contact with their antagonists during the excursion when the stroke does not exceed the cusp width.

If we bear in mind that the location of any three points of a solid are sufficient to determine its position, we can determine the relative position of the mandible to the maxilla by establishing the relation of three points of one with respect to the other. By means of bites taken in various occlusal positions, we not only establish the relations of the occlusal surfaces of the mandible and maxilla but we can also determine the positions of the condyles relative to the glenoid cavity.

Our ideals of normal occlusion are derived from a study of the conditions existing in the most perfect natural dentures. It was by this means that Dr. Bonwill learned the principles which he established, and thus opened the way for further study. Among those who have contributed to our knowledge of occlusion are Gysi, George Wilson, Angle, Leon Williams and George S. Monson.

It was early pointed out that the buccal cusps of the upper teeth from cuspid to third molar lie approximately on the arc of a circle, which when extended generally conforms quite closely to the inclination of the articular surface of the glenoid fossa. This curve has been known as the curve of Spee. More recently, Dr. Monson has shown that all the cusps of the posterior teeth in many cases conform closely to the surface of a sphere. This introduces the conception of a transverse curve in addition to an anteroposterior one.

A little study of the maxillomandibular joint shows that the two sides constitute parts of the same joint since the

mandible is a single bone, and the bones of the base of the skull are so firmly united as practically to constitute another solid body. As a result, any movement taking place in a joint on one side must be accompanied by a corresponding movement on the opposite side.

However, careful observation will demonstrate that, even if we consider the two sides as constituting part of the same joint, we must consider the articulation as composed of two joints in close proximity. The upper joint is that between the eminentia articularis and the fibrocartilage and is of a gliding character. The lower one, separated from the first only by the thickness of the fibrocartilage, is the joint between the head of the condyle and the fibrocartilage. This is a pure hinge joint. Here, then, is the key to the movements of the mandible, since any change of relation of the mandible to the maxilla is the result of movement in one or the other of the foregoing joints or a combined movement in the two. We conclude, then, that there are only two elementary or component movements, but variation in direction of the gliding movement combined with varying degrees of the hinge movement produces an infinite variety of resultant movements. The joint between the heads of the two condyles and their respective fibrocartilages constitute together a single hinge joint, the axis of which passes through the heads of the condyles. In prosthetic work, a face bow is used in order to mount a cast in correct position to this axis of opening and closing movement.

The gliding joint between the fibrocartilage and the articular surface of the glenoid allows a gliding motion in various directions and in various degrees, limited only by the extent of the surface and the laxness of the ligaments. The movement at one condyle may be greater than at the other and may be in a different direction. This condition was explained by Dr. Gysi as a rotation about a point which he called a rotation center. If we take a patient having condyle paths of equal slope on the two sides and replace the occlusal surfaces of the teeth by a spherically curved surface, we will have a condition in which the patient is able to move the mandible to every protruded or lateral position and still maintain an even pressure throughout the whole of the spherical surface. These movements will require no motion in the hinge portion of the mandibular joint since there are no cusps to cause separation of the jaws, the only movement required taking place between the fibrocartilage and the articular eminence. This joint then is a pure spherical or ball and socket joint. Only a small portion of the surface of the sphere, however, is represented in the joint. The variation in extent and direction of the movement at the two condyles is determined by their position with respect to an axis through the center of the sphere about which the motion takes place. There are innumerable axes through the center of the sphere about which the mandible may move. Three of these only are of importance. They are the axes of right and left working bite and the axis of protrusion. The other axes are all intermediate in position. The axis of working bite for either side may be considered as starting from Gysi's rotation center and passing through the center of the sphere. Thus, this rotation center is a pole on the sphere.

If the condyle slopes on the two sides are the same, all the axes will pass through a single center, and we have a true spherical case. If the condyle slopes are not equal on the two sides, the axes may not intersect at a single point, and the symmetry and harmonious motion will be more or less impaired. It is not necessary, however, that the condyle paths lie on the surface of the sphere that passes through the occlusion provided only that they are concentric with

it. Thus, they may be closer or farther from the center of the sphere without altering the mechanical results. If a line drawn from the center of the sphere to the condyle path is perpendicular to this path, it may be considered as part of a concentric sphere. If this line forms an obtuse angle with the condyle path, the slope of the condyle path is too steep, and protrusion will result in separation of the spherical surfaces at the heel. This condition is corrected by making the radius of the sphere smaller, producing in a sharper bend in the curve of Spee and a greater inclination to the sagittal plane. If, in the second case, the condyle path forms an acute angle with the radius of the sphere, the path is too flat, and protrusion will result in interference at the heel, causing a separation at the incisal. Correction of this condition is accomplished by increasing the radius of the sphere, thus flattening the curve of Spee. If the condyle paths do not have the same slope on the two sides, the spherical surface is distorted. Even with this condition, balanced occlusion is possible by having cusps of different heights on the two sides.

From the foregoing analysis, it is apparent that there is an important relation between the condyle path and the movements of the mandible. Dr. Gysi brought out these relations, but some of his conclusions have been questioned by others. I believe he is essentially right in stating that the condyles exert a positive pressure on the eminentia and therefore are guiding surfaces for the condyles. In a paper presented before the Prosthetic Society at Los Angeles last year, I made a careful review of the possible conditions. The conclusions which I reached were that there is always pressure at the balancing condyle and generally a lesser degree of pressure at the working condyle; but that, when the bolus of food is very far back, the pressure at the working condyle may be come zero or even negative, when the condyle would be lifted from the eminentia.

We have just been discussing the protrusive and lateral movements of the mandible. These are the movements which Dr. George S. Monson had in mind when he formulated his spherical theory. This theory is not only a logical deduction from the foregoing facts, but it is supported by a study of the development of the bones entering into the masticatory apparatus and the changes of form which they undergo during the eruption of the permanent teeth. This phase of the subject has been thoroughly considered in an article by Sir Arthur Keith and George C. Campion.[1] The facts which they bring out, while not written with any reference to the spherical theory, are nevertheless in complete harmony with it. The spherical theory, to my mind, offers the simplest and best explanation of the mechanism of mastication as it is related to orthodontia, prosthodontia, periodontia and operative dentistry.

It suggests many valuable methods of procedure in prosthodontia and will do the same in orthodontia and the other branches when it is applied to them.

One of the most valuable developments from the spherical theory in my hands has been the perfecting of an accurate method of taking the bite in edentulous cases. This depends on the use of base plates with spherical bite rims. By adapting Dr. Gysi's idea of an incisal tracing, but using three tracing points, it is possible to obtain records of the movements of the incisal point and a point in the molar region on each side. The bite rims with these tracings afford an absolutely dependable bite as well as all the records necessary for adjusting an adaptable articulator.

These tracings are a positive means of determining central occlusion, and they also show the complete range of

1. Keith, Arthur, and Campion, J. C.: Orthodon., Surg. & Radiog., October, 1922.

occlusion. If for any reason we desire to shift the point of central occlusion, we may establish it at any point within the range of occlusion. If the cusps of the teeth are intermeshed in such a manner as to make the point of closest approximation of the mandible to the maxilla coincide with the chosen point, it will then function as a new central occlusion. To maintain this condition, the cusps must interlock securely, and the anchorage must be sufficient to withstand the lateral strain, which opposes the return of the mandible to its previous or normal central occlusion.

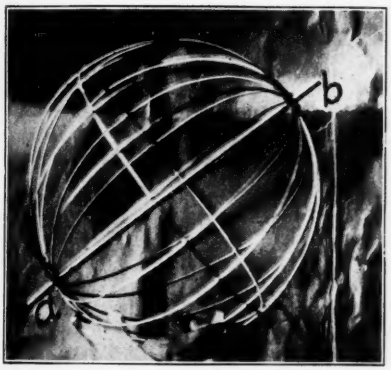


Fig. 1.—Anterolateral view of mandible, showing axis of working bite (*a-b*).

By allowing the mandible to fall away from the maxilla a short distance, a crescentic space will be opened between the upper and lower teeth. The anterior teeth will be separated a greater distance than the posterior. Dr. Bonwill showed that the overbite of the anteriors and the cusp depth of the posteriors must vary in height in proportion to the separation between these arcs in order that a balanced occlusion may exist. This degree of harmony does not as a rule exist in natural dentures, as frequently the overbite of the anteriors is too great, resulting in a separation at the heels in protrusive bite. However, Nature generally attempts to remedy this condition by a greater curvature in the curve of Spee or the equivalent, a flatter condyle path.

## Conclusions

1. The condyles generally exert a positive pressure on the eminentia; consequently, they are guiding surfaces of mandibular movement. It is therefore necessary for an articulator to be adaptable to these conditions for accurate results.

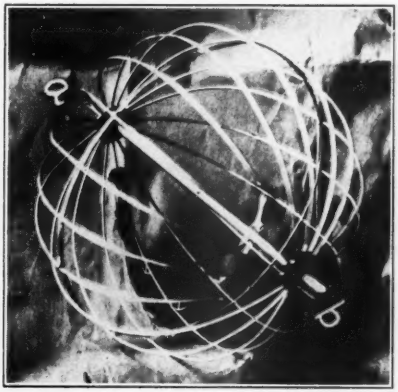


Fig. 2.—View of mandible at right angle to Bonwill's triangle, showing position of axis of working bite (*a-b*).

2. The slope of the condyle paths determines the radius of the sphere about which lateral and protrusive movements take place.

3. There are three principal axes of the spherical motion, one each for the right and left working bites and one for protrusion.

4. The axis of opening movement is a transverse axis through the heads of the condyles. Correct placing of models with respect to this axis requires the use of a face bow.

5. The movements of mastication are produced by simultaneous spherical and hinge motion.

6. Balanced occlusion is attained

when the teeth are arranged so as to maintain contact with their antagonists and still avoid points of interference in gliding from one occlusal position to another.

7. The curve of Spee harmonizes the overbite of the anteriors with the cusp depth of the posteriors and with the slope of the condyle paths.

8. By making the teeth conform to the surface of a sphere of the right radius, many conditions of malocclusion may be corrected and traumatism eliminated. In young patients, it is probably possible to adjust the teeth in conformity to a spherical surface and retain them in this position until the articular surfaces of the glenoid are molded in harmony. In older subjects, it is probably best to make the occlusion conform to the existing slopes of the condyle paths.

In the study of any particular case, the operator must answer the following open questions: Do we wish to conform to existing conditions? Do we wish to modify for mechanical or therapeutic reasons? Do we wish to modify to establish ideal relations?[2]

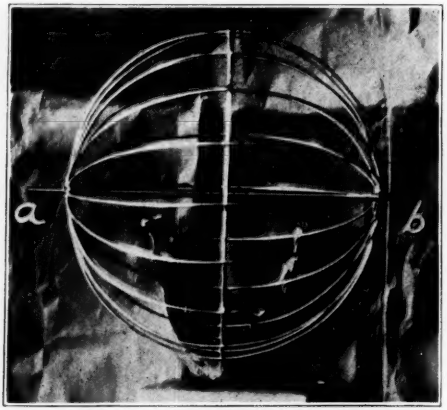


Fig. 3.—Same view as in Figure 2, but showing axis of protrusive bite.

## Discussion

*C. K. Bird, St. Paul, Minn.:* I should like to ask Dr. Needles to explain the difference between articulation and occlusion.

*Dr. Needles:* As I understand it, occlusion is a passive, statical condition; that is, it is coming together in one spot and staying there, and articulation is coming together in that spot and sliding to another. That is the difference between articulation and occlusion. To obtain occlusion, teeth only have to be in contact in a definite place. To obtain articulation, they have to be in contact there and slide to another place and still be in contact.

*B. B. McCollum, Los Angeles, Cal.:* The last question interested me because I found myself, in a paper which I have been endeavoring to write, confronted with that question, and I found, on investigation, that I was wrong. My conclusions were just what Dr. Needles' were: that occlusion means the teeth touching at any position that the mandible may assume, and I assumed that articulation meant the passage from one occlusal position to another; but I find the American Dental Association has practically written "articulation" out of our language.

2. In addition to the three illustrations here shown, others may be found in Needles, J. W.: J.A.D.A, 9:866 (Oct.) 1922; 10:918, 927 (Oct.) 1923.

Articulation, to them, means simply the placing of the teeth in position on the machine. It has nothing to do with the occlusion at all. What Dr. Needles has defined as articulation is defined by the Committee on Nomenclature in the American Dental Association as functional occlusion. They can find no one word which will tell us about it.

I think that it is very important that our language be made so that everyone in the audience will know what we are talking about, and if he doesn't know, he can go to the dictionary and find out, so that we won't have confused terms that will lead somebody to believe that he knows, and then later to find out that he misunderstood.

*George S. Monson, St. Paul, Minn.:* We have had some battle royals on the subject of articulation and occlusion in our committees in the Prosthetic Section. In New Orleans, I attempted to segregate the two terms articulation having to do with the temporomaxillary joint, the range of articulation and the position the mandible may take in the varied excursions relative to that joint; occlusion and range of occlusion, starting out in central occlusion and range of occlusion that would take in the protrusive occlusion, the lateral occlusion and all the intermediate angles. But in Boston, these conditions were defined as central protrusive and lateral protrusive occlusion. Of course, the looser the muscles and ligaments become as the cusps wear down and the ligaments relax, the greater the range of occlusion; which is a bone of contention now with cusps of great depth or cusps with flat angles or obtuse angles. So many of our problems are based upon this question or the basic principles of the working of the mandible.

We will never get very far in solving the many problems that are confronting us, such as the pathology of the tooth-investing structures, the condyle temporomaxillary articulation, the disorders there and the structures pendent on the mandible, such as those that enter into dentition, without first having a premise. At this last meeting, although nothing else was accomplished, tests were made which determined certain principles. We are making progress in that line, and we hope in the near future to put into your hands aids in the study of pathologic conditions and deformities.

*F. E. Roach, Chicago, Ill.:* To my mind, there is practically no similarity in the arrangement of teeth in partial restorations to that of the full denture. I mean by that, that in the partial denture we have the relations of the jaws determined. If we have any number remaining we have the occlusal relation established for us, which is altogether different from the full denture, in which we have no teeth, and in that event we can arrange the teeth in their occlusal relations according to any rule that we may follow, using any kind of an articulator that we may wish to use, that is constructed on anatomic principles, as many of our articulators are today.

In the arrangement of teeth, in securing occlusion in our partial restorations, there is as much, or more depending on the proper occlusion than on almost any other one thing. More damage is being done to the natural teeth by reason of malocclusion of our partial restorations than by almost any other one thing; that is, it is equal at least in its destructive tendencies, its destructive influences on the natural teeth, to almost any other one thing.

We must, of course, have accuracy of adaptation in our partial restorations; we must have coordination of our anchorages, whatever they may be; whether they are attachments or clasps, and then we must have accuracy of relations between our anchorages and our saddles. But, unless in addition, we secure proper occlusion, our cases will in a measure be failures.

In my judgment, the articulator plays but a small part in securing this proper occlusion, for the simple reason that, as already stated, we have the natural teeth that predetermine and guide us in this arrangement, and the final adjustment of the occlusion must be made in the mouth, regardless of the kind of an articulator that is used; and that can be done in the mouth better than it can be done with any form of articulator that any man has made. My experience has taught me this.

I want to emphasize, then, the importance of the greatest care in the final adjustment after we have used the articulator and obtained the best results that we can with it. In the final adjustment, get that nicety of the occlusal relations by grinding and careful adjustment with the carbon paper in the mouth, thereby reducing strain, leverage and lateral torsion to the minimum.

*E. H. Bruening, Omaha, Neb.:* In spite of the definition given to us in the House of Delegates by the Nomenclature Committee of the American Dental Association,[3] few

3. In Anthony, L. P.: Report of Committee on Dental Nomenclature, J. A. D. A. 10: 1039 (Nov.) 1923, articulation is defined thus: "The arrangement of artificial teeth to conform to the requirements of the edentulous space or spaces which they are to occupy and to adequately serve the purposes of the natural organs which they are intended to replace. **Note.** Articulation refers to the actual placing of artificial teeth, one by one, into the required position; but articulation is not to be used to describe the occlusal relations of artificial teeth after they have been so arranged. Occlusion is defined as "the contact of the teeth of both jaws when closed or during those excursive movements of the mandible which are essential to the function of mastication."

of us understand today just what anyone means when he talks about occlusion. I hope that in the future this field will be clear; that we will understand definitely what is meant by these terms. Dr. Needles, in his slides dealing with full denture cases, has presented to us what seems to me an original idea in the use of the roentgen ray to illustrate occlusion. This could be very valuable in these cases. What he has shown is exceedingly interesting.

*B. B. McCollum, Los Angeles, Calif.:* I think the time is here, as Dr. Monson intimated, when we must measure the defects that have been engendered by the mutilation of the mouth, which necessitates the placing of partial dentures. The extraction of teeth, even over a very short period of time, means more or less—generally more—interference with the line of occlusion and the possibilities of creating that necessary balance without mechanical interference on our part.

Simply to place a partial denture in a mouth so that the patient can close his jaws comfortably in rest position or in central occlusion, and to have the appliance that we placed there entirely out of working position the minute that the patient puts it to work is not operating on that line. That sort of a restoration might last a long time because it has nothing to do; the patient cannot use it.

The problem that confronts us is a study, and an intimate study, by the rank and file of us—not by a few men who are going to stand up and talk about it, but by the men who are doing the work—of the necessity of determining the amount of the deformity and correcting it, so that we make a machine of the masticatory apparatus which does not wear itself out by being wrongly opposed or antagonized. That is the thing which produces traumatic occlusion—the lack of harmony.

*Charles A. Furrow, Tulsa, Okla.:* I think when the American Dental Association or the body that is functioning as the denture prosthetists can give us a method whereby we can obtain the relations of an individual's mouth and transfer them to an articulator, whether it is partial denture, fixed bridgework or removable bridgework, and this method can be conveyed to the men in the highways and byways who can carry it out, we will have better dentistry than we have ever had before; but thus far this method has not been given to us.

*Dr. Needles, (closing):* I have outlined some of the physical conditions. There is one other physical condition that is very important to consider, resiliency of tissues. When you add this to the other geometrical relations, you have practically all the conditions that can be met. If you know what the fundamental facts of the movement of the mandible are, and consider what alterations resiliency of tissue can produce, you are able to find out all the practical things that are possible.

I feel that there is no difference between the mechanism of the jaw when you are using it with artificial dentures and when you are using it with a crown or an inlay, because you have to know what the movements of the mandible are and make your work conform to those fundamental facts. There is no question that we are not able to do exactly on an instrument what the mandible does; but if we know the facts, we can come very close to doing it. In full dentures, one can get a result that is remarkably good, on an instrument; and if an instrument is adjusted in a similar manner to do partial denture work and in addition resiliency of tissue is taken into consideration, the work can be carried out almost as accurately on an instrument as in the mouth; in some respects more accurately.

About the only difference between reconstructing an occlusion on natural dentures and trying to build the same thing on artificial dentures is the degree of precision which one can attain. In natural dentures, one has more precise factors than in full denture work, and it is necessary to make the guiding surfaces more individual than it is in artificial dentures. Unless one intends to reconstruct the whole occlusion all of the irregularities and the things that are not ideal must be put in, and as to that, I do not differ from Dr. Roach. I believe that in many patients it is better to get mechanical results with the conditions as they are than it is to attempt to change those conditions to something better. Dr. Roach brought up the question of occlusion again, and I think that he is using the word occlusion to mean central occlusion. Regardless of the ruling of the Committee on Nomenclature, I think you have to use the word articulation in the sense that it is used anywhere else. In anatomy, it means, primarily, a joint movement and the only joint you have between the teeth is occlusal surface contact. It is not a joint until you have movement, and therefore it means sliding movement from one occlusal position to another.

# INLAY TECHNIC

By V. T. NYLANDER, D.D.S., Chicago, Illinois

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

IN this city, some years ago, a dentist remarked that "in dentistry there is no such word as perfection." With this in view, one hesitates to attempt a description of a technic that will assure virtually perfect results in the making of gold inlays. However, we gain courage to proceed when we realize that perfection is not within the human grasp, but the power to approach it lies within every one of us, in concentrating the attention on the specific little details of which the finished product is the result. No product is better than the weakest or most unscientific part of its entire makeup. I shall, therefore, attempt to cover the underlying principles of the entire process of inlay making from the finishing of the cavity to the completed case, instead of merely some one link in the chain of procedures. Unfortunately, the links are so many and must be so carefully developed that it is quite impossible to do justice to any one part. It is assumed that the listener is so familiar with the subject that the definitions and gaps will be filled in.

## Cavity Finishing

Histologic sections of teeth show that the enamel rods extending from the dento-enamel junction to the surfaces are at approximate right angles to the surfaces of the tooth. When an inlay cavity is prepared so that a pattern can be removed with comparative ease, all the enamel rods on the occlusal surface of the tooth, from the occlusal to the dento-enamel junction, are beveled, giving a strong support to the rods forming the margins of the cavity. It is, therefore, not necessary to bevel the marginal walls of the cavity in order to give further protection to the enamel rods at the occlusal cavosurface angles. The same long bevel of the enamel rods should be continued to about two-thirds of their depth on the proximal surfaces of the cavity or on smooth surface cavities in place of short irregular bevels. This gives us visible sharp, definite margins to which accurate wax pattern margins can be produced.

With finely cut taper finishing burs (or worn-out taper fissure burs with fine emery paste) for the occlusal portions; fine ridged cuttlefish and French emery disks for the buccal and lingual cavity walls, and sharp bevel angled hoes or gingival margin trimmers for the gingival, the cavity walls can be polished smooth and the margins made sharp. One should gage the directions of the polishing by the instrument in the handpiece or hand, instead of trusting the eye entirely. Finely polished and accurate cavosurface angles can be produced in this manner. If the cavity is very extensive, and particularly in a young person, the cavity should be sterilized and dried and the cavity lining painted over the dentin portion of the cavity.

## Matrix

A thin-hard matrix material, rigid enough to cut wax, used in a matrix retainer that does not interfere with occlusion, is advisable for all proximo-clusal cavities in order that there may be

uniform density of the wax pattern and it may be forced to all parts of the cavity. A slightly curved strip of matrix material is cut, the curve depending on the bell-shaped form of the tooth, and placed in the retainer and tightened around the tooth, the operator making sure that the matrix extends to at least half a millimeter, gingival to the most gingival part of the cavity. The matrix is then burnished to the contact points of the adjacent teeth, and the marginal ridges of the adjacent teeth and the height of the cusps are marked with a sharp explorer. The matrix retainer is loosened a half turn or more if necessary, and removed. It is then trimmed with a curved pair of shears, to conform with the occlusal surface of the tooth. The matrix retainer is wiped with a pellet of cotton dipped in a thin oil, so it will not adhere to the wax.

### Wax and Pattern Making

A hard wax that will fracture rather than bend at open mouth temperature, that can be made quite plastic at a temperature comfortable to the patient and that volatilizes readily, leaving the least possible amount of residue, should be used. The wax is preferably softened by immersing it in warm water, the temperature varying according to the wax used from 120 to 136 F. It is left in the water until the entire mass is plastic, and is then quickly placed in the prepared matrix retainer, with the least possible manipulation, the prepared band being filled almost completely with one piece of wax. The cavity has been washed out with a stream of warm water to get rid of any heavy saliva or blood. Without letting the saliva refill the cavity, the matrix containing the wax is forced to position, a finger held tightly over the occlusal portion of the matrix, forcing the plastic wax to all portions of the cavity, making sure that the wax oozes out over the gingival margins. With the fingers or instruments at the cusps portions the matrix is forced to its exact position, the patient being asked to bite, but not articulate, and to hold the mouth closed while the matrix is tightened the amount that it was released on its removal, allowing the wax to set. The rigid matrix will act as a knife against the sharp gingival margin, cutting off the greater portion of the excess wax.

The excess wax is removed from the embrasure, outside the matrix band, and the occlusal of the adjacent teeth. Then the entire occlusal portion except the marginal ridge, is carved up to the finished detail, while the wax is held firmly by the matrix retainer. Several good carvers are made. Their good or bad qualities vary with the likes and dislikes of the operator. Black's wing scalers or the sides of a cleoid sharpened to a straight edge serve very well for the occlusal. All wax carving instruments should be very sharp and smoothly polished so excess wax will be cut off and not dragged away. By resting the instrument on the tooth surface directly adjacent to the cavosurface angle and cutting with a glancing cut almost parallel with the cavity outline, but with a slight deflection from the wax toward the tooth, the margin can be approached without danger of leaving the pattern short or having an overhang. This is particularly true when the uncertain bevel of the cavity wall is eliminated and the margins of the cavity are polished.

The matrix retainer is removed and the matrix material is drawn out with pressure against the adjacent tooth. If it is a two surface restoration, the portion that is between the sound tooth surfaces should be removed first.

Ward's No. I wax carver is very convenient for shaping the contour of the marginal ridge, the buccal and the lingual portions of the pattern. The gingival portion, however, needs very careful attention especially at the mesial surfaces of the molars and upper bicuspids where we frequently have a

marked concavity. A special cutting instrument that will enable you to carve below the free gum margin without injuring the attachment can be produced by making a cutting edge on the side of a right angled explorer and bending it to a convenient form.

The wax pattern may then be polished lightly with very soft strips of silk, the stroke being alternated so that the margin of the wax pattern will not be drawn away from the cavity margin. An occlusal polisher can be made by catching the strip of silk with the foil carrier and wrapping the silk around it or by rolling the silk on a small taper fissure bur.

Some clinicians advocate the burnishing of the wax margins. This is not essential since the entire pattern has been carved with a sharp instrument and without the slightest movement in the tooth. Furthermore, a thin layer of wax can be made to curl by burnishing it on a smooth surface with a separating medium between the wax and the surface, especially if it is not stroked in the proper direction.

The wax pattern should be an exact reproduction of what you wish the finished product to be, with the exception of the contact point. All pits, grooves, fissures, planes, marginal ridges and contours should be produced according to the normal tooth anatomy of the individual on whom you are operating. Irregularities, lost teeth and pathologic conditions may demand a deviation from this rule.

### Removal of Pattern

The most exacting way to remove the wax pattern without producing undesirable expansion in certain portions of the wax would seem to be by inserting the sprue-former into the pattern while it is in the tooth. A small tapering sprue-former, about 0.5 to 1 mm. in diameter, with the portion to be inserted into the wax slightly roughened and free from any oil, is preferable. By holding the sprue-former in the fingers and touching the tip of it to the flame, overheating and overexpansion of the wax is prevented. It is inserted with practically no pressure into the outer edge of the marginal ridge directly above the contact point, where we have the greatest bulk of wax. The sprue-former may then be cooled while held in position by being touched with a pellet of cotton dipped in cold water. The pattern is removed directly in the line of construction of the cavity preparation without the slightest lateral movement. If the restoration happens to be a three-surface one, a V-shaped sprue-former can be made of wax and the free ends fused to the marginal ridges. An explorer or foil carrier can then be inserted into the angle of the V and it can be lifted out with equal pressure on both marginal ridges. If necessary, the junction of the sprue-former and the pattern is carved to a curve to prevent particles of investment from being driven into the mold during the casting.

### Investing

The sprue-former with the pattern attached is placed firmly on the crucible-former or base in such a manner that there will be as nearly as possible an equal amount of investment on all sides of it. The pattern is placed immediately under lock and key by investing it without subjecting it to various temperatures and humidity changes. If any blood or heavy saliva adheres to the pattern, it should be washed with water of as nearly room or open mouth temperature as possible.

Any good, uniformly smooth heat-resisting investment is satisfactory. Investments are generally composed of a good grade of plaster-of-Paris, fine bolted silex and graphite in varying quantities. These ingredients should be thoroughly mixed before any part of the contents of the can is used, because of the differences in the specific gravities and other properties of the different ingredients. It is a mechanical mixture, and if shipped any

distance, the more granular and heavier particles will naturally sink to the bottom of the can.

The amount of water needed for each kind of investment, and the time of spatulation, will vary according to the quantity and quality of the plaster. Water of room temperature in a sufficient amount seems most satisfactory, enabling one to spatulate and apply the investment. An excessive amount of water will leave larger interspaces in the investment, which will receive the gold under pressure, giving a rough casting. Careful, thorough spatulation is essential in order to displace the air in the investment by water and saturation of all particles of the plaster so as to insure a uniformly setting mixture of the greatest strength, smoothness and resistance. Spatulation can be well done by the machine mixers that are on the market or by hand with a large round-bottomed plaster bowl and a flexible spatula that will take the shape of the side of the bowl to beyond the middle of the bottom. By placing the bowl on the side in the palm of your hand and rotating it as you are spatulating, with the spatula dragging against the inner surface of the bowl to beyond the middle of the bottom, air will be worked out of and not into the investment.

The investment ring is moistened and placed in readiness. A soft pointed camel's hair brush is dipped in the room temperature water and the excess moisture is wiped off by drawing it through the fingers. The investment is painted from the base along the sprue-former to the pattern, being gently teased ahead of the brush point into all details and gradually worked up to the superior portion of the pattern, all possibility of incapsulating air between the investment and the wax being thus removed.

The moistened investment ring can then be placed on the base and the remaining investment poured down along its inner edge and teased into place with the camel's hair brush. The pattern has then been invested without any pressure save that of the light touch of the camel's hair brush. Double investing, using a very fine investment, for a thin coat and a coarser, stronger, more resistant investment for the bulk portion, can be used with the same accuracy, but takes more time.

The invested pattern is allowed to stand until the investment will break with a clean fracture, and not crush under slight pressure, before any heat is applied to it.

### Cavity Protection

At this stage, the patient will probably be dismissed. In that case, the cavity should be thoroughly dried and a resistant material like baseplate guttapercha carefully sealed into the dried cavity moistened with eucalyptol oil. All margins of the cavity should be thoroughly covered to prevent any injury to the sharp fresh margins by either chemical or mechanical means.

### Dissipating the Wax

The dissipation of the wax may be accomplished by any one of two or more methods with equally effective results, provided the fundamental principles and details of each technic are closely adhered to. The two general methods used with good results are: the rapid method of low temperature to the interior of the mold, and the slower method of a higher temperature.

In analyzing and experimenting with the two methods, though entirely different, the end-results seem nearly equally good. In the rapid process, the outer portion of the investment is subjected to a rather high degree of heat. The high temperature is applied at the start and only long enough to melt and force the wax out of the mold with the excess water. The wax is then dried with a low degree of heat to the point where no moisture will appear on a cold mouth-mirror held directly over the in-

vestment. The outer portion of the investment begins to disintegrate, but the inner portion is left strong with the water of crystallization intact and only the excess or free water driven off. This makes a strong buffing surface to the interior of the mold, preventing the gold from being forced into the interspaces of the investment and causing rough casting.

In the slow heating process of low temperature at the start, gradually increased, the investment is dried first and then the wax eliminated. In this process, a considerable portion of the carbon in the wax is diffused throughout the investment after the interior portion has been heated to the degree of the volatilization of the wax. The free carbon is driven off and the heat removed when the smoking stops. The interior of the mold is subjected to a much higher degree of heat and the plaster-of-Paris is almost entirely disintegrated, but the mold and the interspaces in the investment are lined with a film of carbon, which acts as an antiflux. With a low degree of pressure and this resistant antiflux, the gold will not be driven into the interspaces, and an equally smooth casting is the result.

In each case, the invested pattern should be heated in some type of furnace so the heat can be uniformly applied and regulated and air currents eliminated.

## Golds

Very little need be said about golds, because any of the standard ones will produce good castings. At least one-half of the gold used for the casting should be fresh gold melted and fluxed with borax or borax with saltpeter on a charcoal block, with any scrap gold to be used, in order that it may be thoroughly cleaned and fused into a ball, and heat can be applied uniformly and quickly to the entire mass. When plunged in acid and washed, it can be cast nicely without any further addition of flux. Care should, of course, be taken not to oxidize or overheat the gold.

## Heating of Golds for Casting

Numerous types of heating combinations and devices are in use at the present time; namely, compressed air and gas; oxygen and gas; oxygen and hydrogen; hydrogen and air and the automatic electric.

On account of the affinity that platinum has for carbon, the flame combination eliminating the carbon from it seems the logical one for golds alloyed with platinum. The gas and compressed air combination seems the most unsatisfactory because it is slow, and wherever the metal is heated on the investment a large portion of the investment will be overheated by prolonged heating. Compressed air nearly always has globules of water in it that may be thrown out on the gold at very inopportune times. However, it has the advantage of not being so liable to overheat the gold.

The combination of oxygen and hydrogen or oxygen and gas produces splendid flames for general casting, but the technic of handling them needs to be carefully developed to prevent overheating. This flame is accurate and very hot, so that the gold will be brought to and kept in the fluid state the shortest period of time before it is confined in the mold.

The electric method seems very logical, but as yet I have not used it.

In each case, when a flame is used, the heat should be applied uniformly over the entire globule of gold, with a soft brush flame and with no portion of the nonoxidizing part of the flame touching the metal.

Any casting machine or method giving from 5 to 10 pounds of uniform pressure will serve the purpose for inlay casting provided the details for the method or for employment of the machine are closely adhered to.

Casting as soon as the flask is removed from the oven, allowing the casting

to set and cool slowly, with the investment surrounding it, to the temperature at which it can be handled, appears to give the most satisfactory results.

After the investment is brushed and thoroughly washed away from the casting, it is boiled in acid. It should be examined carefully and any globules of gold removed, and each step in the technic should be checked. The casting is tried in the cavity before soldering is done. It should go in place with finger pressure to within a thin tissue paper thickness height above the margins. A light tap with the mallet on an orangewood stick should bring it to place. The occlusal portion and margins of the inlay should be finished completely at this stage, the amount of contact that will be needed and its exact position being noted. The inlay is removed carefully in direct line and the contact is soldered. Antiflux such as Steel's can be used, covering the marginal ridge and about half a millimeter of the proximal surfaces adjacent to the margins in soldering. The inlay is recleaned, contoured and polished, and given a second trial before it is cemented in place, position and form of contact point and proximal contour being tested.

### Setting Inlay

The cavity is washed out with a stream of warm water. The section of the mouth is packed with cotton rolls and napkins to exclude the saliva and the moisture exhaled. The cavity and inlay are sterilized and dehydrated with alcohol and warm air. A thin film of oil is painted on the proximal and occlusal surfaces of the inlay to prevent the cementum from clinging. The cement is spatulated to a medium setting, smooth, creamy elastic consistency with a clean spatula on a smooth glass slab, both spatula and slab having been wiped with alcohol and dried.

A thin film of the cementum is applied to the inlay first and then to the cavity because the temperature of the tooth will hasten setting. The inlay is forced and tapped into place with an orangewood stick and mallet, and held firmly in position until the cementum is set. The excess cementum is peeled off; the gums are massaged and a stream of warm water is allowed to play over them and the inlay.

Again, let me say that the quality of the finished product is measured by the detailed care and attention that we give to each and every one of the many steps and not to any one of them.

### Discussion

*Alden J. Bush, Columbus, Ohio:* Notwithstanding the fact that Dr. Nylander recognizes that perfection is not within the human grasp, but the power to approach it lies within each and every one of us, he proceeds to cover the underlying principles of the entire process of inlay making from the finishing of the cavity to the completed case without so much as even once referring to the indirect method. This indicated to me that he had made a choice and recognizes that the direct method is the most scientific in principle and the one which offers the greatest possibilities in the production of gold inlays. I most emphatically agree with him on this point.

In reference to cavity preparation, it is pleasing to note that he emphasized the importance of very sharp, definite cavity margins at all cavosurface angles; which, of course, precludes inlays with overlapping margins. There is some question in my mind regarding the advisability of using fine polishing materials on cavity wall and cavosurface angles. Personally, I am satisfied that the planing-like action of a sharp chisel, properly directed, will do the same work more expediently and with greater precision, and will comply in every particular with all requirements demanded for the proper execution of all subsequent technical procedures, furthermore producing a surface just as nearly ideal and far more favorable for the retention of the cemented inlay.

While considering cavity preparation, I cannot refrain from making a few additional remarks regarding this important subject which Dr. Nylander touches on only briefly: (1) to emphasize the importance of making the cavity of such character as well, to the greatest degree, assure accuracy in the proper seating of the inlay during the process of setting, and (2) to condemn a practice which is very prevalent, that of filling up the interior of

the cavity with large masses of cementum either for the purpose of eradicating extensive undercuts or for saving a little gold. The principle is wrong and the practice is indefensible. It is far better to indulge in a little wider cavity cutting and economize on the cementum.

Dr. Nylander advocates the employment of the matrix in forming the wax pattern in all proximoclusal cavities. I cannot criticise anyone for going to any extreme if he feels that better results are achieved, but it seems to me that in the majority of these cases, this procedure is unnecessary; on the other hand, there are cases that demand the employment of the matrix and in the management of which their nonemployment would invite failure.

To discuss the universal use of the matrix in this connection, I would first have to understand just why it is used, whether on the principle of an instrument to facilitate the forcing of the wax into all parts of the cavity and also to direct its flow to the cavosurface angles without permitting it to escape; or for the purpose of giving the wax the desired surface contour extending from the cavosurface angle to the contact with the adjoining teeth, or, as he stated, as a control to insure a uniform density in the pattern wax.

As a general rule, regardless of whether a matrix is used or not, the wax should be forced into the cavity with a steady pressure from one direction only and should be continued until the wax has been driven into every portion of the cavity. Pressure on the wax should not be exerted from two different directions unless a resultant force is desired. In this case, the resultant force should have a constant direction. Imperfect results may be expected if force is exerted on the wax from two different directions acting at different times; the pressure, therefore, should be constant and exerted from one direction only, and furthermore, after pressure has once been discontinued, it is not safe to resume it.

I will deem it a favor if Dr. Nylander will, in closing his discussion, explain more fully his reason for using the matrix in all proximoclusal cavities and just what is gained by it. The employment of the matrix will bring about a condition, as far as the finished wax pattern is concerned, of which I am in favor; for it is desirable to have a free space intervening between the wax pattern and the surface of the adjoining tooth, thus insuring the removal of the pattern from the cavity without interference from any other source.

I agree with Dr. Nylander when he advises us to place the wax pattern under lock and key by investing it immediately without subjecting it to temperature and humidity changes. This I try to do faithfully, but occasionally I do not, and several times I have neglected to do so until many days have intervened, and have yet to record a failure on this account; still, I would not recommend it as safe practice. After the pattern has been invested and hardened, I do not think it matters one iota whether it is placed over the fire at once or many days later. I prefer to let my investment stand for several hours or over night whenever possible and in so doing I feel that I have gained a distinct advantage, or it has become more nearly "fool-proof", so to speak; and then I take at least three hours for the burning out process.

Many times, I have left the flask over a low Bunsen flame for forty-eight hours or more and then made a perfect casting. Because of these experiences, I am not so sure that the rigid formulas some would have us follow and which must be adhered to and executed with such machine-like precision play such an important part in accomplishing the desired results as some would have us believe. Experience has taught me two things regarding inlay investments; (1) the investment must be full, hard and preferably partially air dried, and (2) it must not be subjected to extremely high temperatures during the burning out process; to be exact, not over the combustion temperature of wax. Dr. Nylander says very little about gold, because, as he states, any of the standard ones will produce good castings. I still use 24-carat gold for casting inlays and fuse on an extra piece for the contact point.

*C. D. Peck, Sandusky, Ohio:* In putting wax into a matrix, I sometimes have not done it well, and I have added a cold piece of wax at that particular point and then use a hot spatula to melt it at the base and complete the form. What would you do in that case?

*Dr. Bush:* I would start all over again.

*Dr. Nylander* (closing:) I just want to answer one question in regard to the matrix. The reason for using it is that there will be uniform pressure on the entire mass of wax rather than pressure at only one portion. The wax will follow the course of least resistance and will flow out at the interproximal spaces without the matrix. It should be held in position and confined under slight pressure while it sets.

# DENTISTRY'S RELATION TO PSYCHOPATHOLOGY*

By E. A. THOMAS, D.D.S., Hastings, Nebraska

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

IN a general survey which I made in 1908[1] of what was being done through the country relative to dental services in the various state institutions, more particularly the psychopathic hospitals, I found that very few states or countries had made any special provision for such service and that the only service rendered these indigent insane patients was the few extractions done by ward physicians. It seemed to be a general belief among psychiatrists that dental service would be an asset in the way of relief from pain, and the conservation of the teeth an adjunct in the mastication of food and a contribution to the patient's comfort and pleasure, but at that time there were but few who thought of dental service as an asset in the prevention of psychopathic condition and the improvement and cure of psychopathic patients.

Since that time, it has been proved beyond a doubt that the foci of infection found in the oral cavity plays an important part in many diseases of the body either as a primary, a secondary or a contributing cause. It has also been demonstrated that oral hygiene is a valuable adjunct in the prevention of dental disorders and is an asset to the general health of the patient.

In the latter part of 1922, I made another survey of every state in the union, and found that very few states had not made some special provision for dental service in its psychopathic institutions, and to a questionnaire sent out at that time to the medical directors of one or more of the leading insane asylums of each state in the union, the answer was emphatic that dentistry was an asset to a state in the care of such patients and they were greatly in favor of this service as an adjunct in the care and physical relief of the patients, but very few ventured the opinion that they had found it an asset in the cure of psychosis. Many gave the impression that need of dental care might be a contributing cause in some cases, but was a remote factor in the classes and types of insanity as a whole.

With no precise definition of insanity, no positive known proof of the exact relationship of the mind and anatomy, with vast and varied causes and so little research work having been done, we do not venture at mere conjecture at this time as to the real status of dentistry and its part in psychopathology from a biologic standpoint.

With the ever-changing differences of opinion and new discoveries and no really definite standard classification of psychopathic disturbances on which we could rely, the Research Department of the Hasting State Hospital in its first objective (What relation does dentistry have to insanity?) came to the conclusion, after studying the outline of causes given by Dr. William A. White of Washington, D. C.,[2] age, physiologic epoch,

*This work is now under grant from the Research Commission of the American Dental Association, Hastings State Hospital, Hastings, Nebr.

1. Thomas, E. A.: Western Dent. J. 1908; Dentist's Magazine, February, 1909.

2. White, W. A.: Monograph, Series 1, Outlines of Psychiatry.

sex and civil conditions), that we could, by their use, start with an established known science, that of mathematics, for a basis. We also reasoned that dentistry could only play a part in psychiatry in proportion to its employment in the mouths of our psychopathic patients. As no provision had been made for dental service in this hospital and but little had been done outside of extractions by ward physicians, we had a good basis for such a start.

After studying and tabulating 1,140 patients as to age, time in hospital, civil state, psychosis, education, occupation, habits, environment, heredity and physical condition, we decided, in order to reach a hypothesis for consideration, to classify them into four great groups in degree of treatment, as to time in hospital: Group 1, all in hospital two years and under; Group 2, from three to five years inclusive; Group 3, six to ten years inclusive; Group 4, all over ten years; then, to subdivide each group into four classes, as: Group 1A, all in hospital two years or less and under 30 years of age, this class to be the hypothesis of consideration; Class B, all those in Group 1 between the ages of 30 and 45 years; Class C, those between the ages of 45 and 60 years; Class D, all those over 60 years of age, and so on, with Group 2, 3 and 4, as shown in Table 2.

It was found that but few patients were dismissed as improved or cured in Group 2, or very rarely ever one from Group 3 or 4, or over five years in hospital; so that Groups 1 and 2, with 392 patients, were taken as our basis of dental study.

Referring to our diagram of causes, we decided that the hypothesis for dental consideration is the toxic, traumatic and infectious; so we would consider impacted and unerupted teeth, all apical abscesses and pyorrhea pockets the dental diseases of most importance.

In determining this, we made a thorough study and tabulation in order of importance as we considered them from a psychopathic standpoint: upper impacted third molars, lower impacted third molars, other impactions, lower apical abscesses, upper apical abscesses, pyorrhea pockets, old root canal fillings, caries and other diseases.

TABLE 1.—CAUSES OF MENTAL DISORDERS

*Predisposing*
- Individual
  - Inherited predisposition (Heredity)
  - Acquired predisposition
- General
  - Age
  - Physiologic epochs
  - Sex
  - Civil condition
  - Climate
  - Civilization

*Exciting* (Stress)
- Physical
  - Toxic*
    - Exogenous
    - Endogenous*
  - Traumatic*
  - Infectious*
  - Exhaustion*
  - Bodily Disease*
- Mental
  - Acting over a short period of time, such as fright
  - Acting over a long period of time, such as worry

In making these examinations, only those cases were called apical abscesses in which there was positive roentgenographic evidence, and pyorrhea, in which only pockets were found with evidence of pus.

A general survey of the mouth was made and of all conditions of the tongue, pal[illegible] and alveolus; size and shape of jaw; Dr. Peterson's[3] classifica-

*Causes in which dentistry plays a part.

3. Peterson, Frederick: Nervous and Mental Diseases, Ed. 8.

tion of arches (gothic, horseshoe, and dome shaped) and the palates (flat roof, hip roof, asymmetrical and torus palatinus), and these findings were checked with those of the same class of patients in our general practice. In this survey outside the constitutional inferior class

TABLE 2.—CLASSIFICATION AS TO AGE AND TIME IN HOSPITAL

| | Female | Male | Total |
|---|---|---|---|
| *Group 1: In hospital two years or less* | | | |
| A. 30 years and under | 26 | 21 | 44 |
| B. 30 years to 45 years | 29 | 45 | 74 |
| C. 45 to 60 years | 23 | 23 | 46 |
| D. Over 60 years | 18 | 44 | 62 |
| | 96 | 133 | 229 |
| Total 229 | | | |
| *Group 2: In hospital three to five years* | | | |
| A. 30 years and under | 10 | 15 | 25 |
| B. 30 to 45 years | 35 | 41 | 76 |
| C. 45 to 60 years | 11 | 22 | 33 |
| D. Over 60 years | 7 | 22 | 29 |
| | 63 | 100 | 163 |
| Total 163 | | | |
| Total considered for improvement and cure by Dental Service 392. | | | |
| *Group 3: In hospital six to ten years* | | | |
| A. 30 years and under | 6 | 18 | 24 |
| B. 30 to 45 years | 41 | 68 | 109 |
| C. 45 to 60 years | 38 | 56 | 94 |
| D. Over 60 years | 9 | 30 | 39 |
| | 94 | 172 | 266 |
| *Group 4: In hospital more than ten years* | | | |
| A. 30 years and under | 00 | 3 | 3 |
| B. 30 to 45 years | 21 | 49 | 70 |
| C. 45 to 60 years | 87 | 139 | 226 |
| D. Over 60 years | 86 | 97 | 183 |
| | 194 | 288 | 482 |
| Total examined | 447 | 693 | 1140 |

and type of psychosis, we were unable to recognize any general predominating characteristics other than would be found in the same number of sane patients.

In Table 1, those causes in which dentistry plays a part are starred. In Table 2, the classification of 1,140 patients in the hospital is given; in Table 3, the psychopathic and dental findings in twelve female and eleven male patients, the hypothesis of dental patients in Group 1-A, and in Table 4 the percentages of dental and psychopathic findings are presented. There were 76 per cent needing dental service and only 58 per cent in whom we believe dental service can be a factor in improvement and cure. This 18 per cent difference is in certain constitutional, senile, or known organic disease, such as paretic or hopeless hereditary cases, which we have ruled out. You will also note that 48.9 per cent have one or more impactions, abscesses or unquestionable pyorrhea pockets, and it is this percentage of the 392 patients in whom we expect results as to improvement and cure.

The 392 patients are 34.3 per cent of the total examined in the hospital; in other words, 65.7 per cent have been in our hospital for more than five years. This means that only a little more than 16 per cent of the population of our hospital could be discharged if the entire 48.9 per cent having one or more impactions, apical abscesses or pyorrhea pockets could be cured. From this number, 16 per cent must be deducted; those patients that are improved and cured, from treatment or spontaneous results, without having any dental service rendered them. The percentage of such parole and discharge for 1921 and 1922 as per capita of all in hospital is approximately 5 per cent. This would leave in our hospital but 11 per cent for whom we could expect a parole or discharge as a result of their having received dental service.

It is interesting to note that females have a little greater percentages of abscesses, caries and pyorrhea, but males have a greater percentage of impactions, and in all the females exceed the males in dental disorders a little more than 3 per cent in Groups 1 and 2.

The physical condition of the male is much better than that of the female,

TABLE 3.—SUMMARY OF PSYCHIATRIC AND DENTAL FINDINGS

| Name | Sex | Age | Civil state | Grade in school | Occupation | Habits | Environment | Heredity | Psychosis | Physical condition | Impacted upper or lower 3rd molars | Upper or lower abscesses | Pyorrhea | Root-canal fillings or caries | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P. A. | F | 19 | Single | 12 | Student | Good | Good | Uncle tuberculous; both grandparents alcoholic | Dementia praecox, hebephrenic type | Very good | U 1 | | | | Bilateral enlargement of the thyroid gland, 1 tonsil large |
| M. A. | F | 30 | Married | 8 | Housewife | Good | Good | Brother, grandmother, uncle, aunt, insane | Dementia praecox, hebephrenic type | Good | | U 7 | Yes | R.C.F. 4 | |
| F. B. | F | 26 | Married | 8 | Housewife | Good | Good | Mother mentally weak | Manic depressive, depressed type | Fairly well nourished | | U 5 | Yes | R.C.F. 5 | Small alveolar cyst |
| I. C. | F | 20 | Single | 12 | None | Good | Good | Tuberculous | Dementia praecox, hebephrenic type | Very good | U 1<br>L 2 | | Yes | | Heart slow, beat irregular |
| M. F. | F | 24 | Married | 12 | Housewife | Good | Good | Brother insane; father mentally poor | Dementia praecox, catatonic type | Fairly good | U 1 | U 1 | | C. 5 | Bilateral goiter |
| M. H. | F | 21 | Married | 8 | Housewife | Fair | Poor | No reliable history | Hysterical type | Good | U 1 | U 1 | Yes | C. 5 | |
| M. H. | F | 27 | Married | 8 | Housewife | Good | Good | Father intemperate | Epileptic | Poor | | L 6 | Yes | | Height 4 ft. 10½ in.; wt. 81 lb.; blood pressure 100 S. 60 D. |
| L. P. | F | 29 | Divorced | 8 | Housewife | Good | Good | No history | Dementia praecox, constitutionally inferior | Large, fleshy, fairly good | | | Very Bad | | Heart, first sound dull; eyeball protruding |
| V. R. (colored) | F | 19 | Married | r & w | None | Good | Bad | No history | Dementia praecox, hebephrenic type with mental defect | Good | U 1<br>L 1 | | Yes | | |
| A. S. | F | 27 | Single | 11 | Housekeeper | Good | Good | Good | Maniacal | Chronic nephritis | | L 1<br>U 4 | Yes | R.C.F. 2 | Very nervous |
| C. S. | F | 29 | Single | 5 | Housekeeper | Good | Good | Negative | Dementia praecox, paranoid type | Under weight, poor health | | U 5 | Yes | | Wt. 82 lb.; poorly nourished, heart apex beat exaggerated |
| M. U. | F | 18 | Single | 0 | Farm work | Fair | Fair | Sister insane | Epileptic | Fairly good | U 2<br>L 1 | | | | Heart systolic murmur at apex |
| A. B. | M | 26 | Single | 0 | Laborer | Used tobacco alcohol | Poor | No history | Dementia praecox, hebephrenic type | Good | U 1 | | | | |
| E. H. | M | 27 | Single | 8 | Farmer | Fair | Poor | No history | Dementia praecox, Paranoia type | Good health | | U 1 | Yes | R.C.F. 2 | |
| C. K. | M | 22 | Single | 8 | None | Good | Fair | No history | Dementia praecox | Anemia | L 2 | U 1 | | | Slightly emaciated |
| H. S. K. | M | 18 | Single | 8 | None | Good | Good | No history | Dementia praecox, constitutionally inferior | Good | U 1 | U 1 | | R.C.F. 1 | |
| J. F. K. | M | 24 | Single | 8 | None | Fair | Bad | Bad history | Manic depressive, manic type | Good | U 2<br>L 2 | | | | Defective ears |
| C. A. M. | M | 22 | Single | 4 | None | Good | Good | Mother insane | Epileptic | Good | | L 3 | Bad | R.C.F. 1 | |
| T. A. M. | M | 22 | Single | 10 | Farmer | Good | Good | No history | Manic depressive, depressive type | Good | | L 1 | | R.C.F. 1<br>C. 1 | Rather nervous |
| H. J. (colored) | M | 21 | Single | 0 | None | Fair | Fair | No history | Dementia praecox | Fair | | U 1 | Yes | | Reform school |
| M. P. | M | 26 | Single | 8 | None | Used alcohol | Good | No history | Dementia praecox, hebephrenic type | Good | | U 1 | Yes | C. 2 | Slight deteration; |
| E. R. | M | 27 | Single | 8 | Farmer | Used tobacco | Fair | Two aunts insane | Dementia praecox, hebephrenic type | Fair | | U 3 | | | |
| E. S. | M | 29 | Single | 8 | Laborer | Good | Good | No history | Dementia praecox, hebephrenic type | Under weight | | U 3 | | C. 1 | Osteomyelitis, sinus infection |

but the percentages of psychopathic and dental disorders as relates to treatment and cure are about equally divided. However, the average life expectation of the female committed to this hospital is but seven years and six months, while that of the male is eight years and nine and one-half months, a difference of one year and three months.

The annual cost of maintenance per capita in this hospital is $193.20. There is, therefore, a liability against the state treasuries of $1,563.70 for each patient committed to our hospital.

If dental service will be responsible for the cure of just 1 per cent of the favorable number in our hospital, it will mean an asset to the state of over $6,000 for these four patients turned back into the proper channels of life, to say nothing of what it will mean to the civil economy.

TABLE 4.—PERCENTAGES OF DENTAL AND PSYCHOPATHIC FINDINGS IN THREE HUNDRED AND NINETY-TWO PATIENTS

*Groups 1 and 2*

| Per cent | Condition |
|---|---|
| **DENTAL** | |
| 76 | In need of dental attention |
| 58 | Favorable to improvement and cure |
| 48.9 | One or more apical abscesses or impactions |
| 28.6 | One or more upper apical abscesses |
| 27.5 | Pyorrhea |
| 20.7 | One or more upper impacted third molars |
| 13.7 | One or more impacted lower third molars |
| 12.7 | One or more old root fillings |
| 12 | One or more lower apical abscesses |
| 10 | One or more carious teeth |
| 8.7 | Other impactions |
| **PSYCHOPATHIC** | |
| 35.6 | Dementia praecox psychosis |
| 21.7 | Manic depressive psychosis |
| 15.4 | Other classes of psychosis |
| 9.4 | Senile psychosis |
| 7.6 | Epileptic psychosis |
| 5.6 | Constitutional inferiority |
| 3 | General paralysis |
| 2 | Paranoia |

In summing up our subject "The first division of the first objective in our research work," our hypothesis of consideration is "prophylaxis." In this, it is necessary that the physician, psychiatrist and dentist cooperate in every incipient case. There has been, because of the mental condition of the patient in this nervous state and an inactivity of those in charge, a neglect of the mouth and teeth and possibly a desire on the part of his or her dentist to put off needed service because of this nervous state, in the hope of a better psychologic period in the near future, which never comes.

In incipient psychosis or any condition in which the patient's mind is becoming unbalanced, or is unbalanced, we are not justified in subjecting the patient to any long drawn out treatment to save a tooth; in taking any chances on treating a tooth or pulp, or in postponing for any length of time any necessary operation when evidence of traumatism, infection or endogenous toxins is present. No dentist is excused from rendering to such patients every possible service because of certain psychopathic diagnosis, hereditary predisposition or what not.

According to Pollock and Furbush of the National Committee of Mental Hygiene, Nebraska stands twenty-third in the number of patients with mental diseases in institutions in the United States, with rates per hundred thousand of general population, Jan. 1, 1920, of 202 patients, while the average in the United States is 220 patients. The patients in our hospital come from all over the state. We have an agricultural state of about average climate and altitude, which has some bearing on psychopathic conditions.

I am indebted to Dr. W. S. Fast, superintendent, and the medical staff of the Hastings State Hospital for their assistance in this survey and study.

## DISCUSSION

*Weston A. Price, Cleveland, Ohio:* Is it not possible that the tooth may be a joint like the other joints of the body and may be

checked from this arthritis process, and that after it has been checked, the tooth changes from a normal tooth to a pulpless tooth, and in that state the infected pulp becomes a new focus of an entirely different type from that infected formerly? There isn't any comparison. The pulpless tooth when it is infected is an infected sequestrum. The infected finger may have some circulation, but the pulpless dentin has no circulation.

Do you find a certain type of dental pathologic process attended with disturbances in the brain?

*E. A. Thomas, Hastings, Nebr.:* So far, our findings are that there is. To designate just what at this time, we are not far enough along with our investigation.

*C. H. Scheu, Cleveland, Ohio:* Have you eliminated certain pathologic conditions? I suppose you had very little results with dementia praecox. Have you done any work on patients who were just slightly unbalanced? My experience at the city hospital with old men who are slightly unbalanced, and suffer from temporary disturbances, leads me to believe that some of these cases of dementia praecox might have been prevented. I am inclined to the opinion that you are not going to get much improvement.

*E. A. Thomas:* In the senile dementia, we don't expect many results.

*C. H. Scheu:* I wasn't referring to the senile type. Many of those patients brought to the city hospital are brought for observation. At the insane hospital, they don't get much in the way of dental care, but these men were around 40, about the time when we would expect a break to come. The psychologists say only about 20 per cent of all the people living could get through high school if given an opportunity. Have these people you refer to passed the eighth grade?

*E. A. Thomas:* Of course these are mostly cases of dementia praecox, in Group 1A under 30 years of age. The majority in our hospital have passed the eighth grade.

*R. C. Murphy, Louisiana:* I knew of a psychopathologic case in which it was decided to examine the teeth. Examinations showed that there were fourteen teeth that had been devitalized, about ten years previously. After their extraction, the patient is in much better condition. Has this any relation to psychopathology?

*E. A. Thomas:* I wouldn't try to answer that. I will just give you a little outline of our work and what we hope to bring to this section two years from now. We have taken 392 cases and are eliminating every possible focus of infection found in the oral cavity. We have the percentage of discharges for five or more years and we are going to start on January 1 and see how many will be discharged the next two years and the next five years. It has been our purpose, as nearly as possible, to eliminate the human element, and we have as superintendent of our institution the man who has made the decisions for the last five years as to what patients were to be considered cured. He will make the decisions in the next two years and the next five years, we hope, and we will take a percentage, compare it and try to get something definite.

*Weston A. Price:* Is there much hope of repair in a simple nervous system lesion that has been in existence for two years?

*E. A. Thomas:* After two years, there are but few patients discharged as cured, or on parole. In all of our cases of parole and cure, the patients have been discharged in less than two years.

*Weston A. Price:* What is the best time to remove the teeth that may be contributing to such a patient's disturbance?

*E. A. Thomas:* In the very beginning, in the incipient stage.

*Celia Rich, Nashville, Tenn.:* In these very distressing cases, in the first place, the patient is in such a condition that he can't be taught the proper care of his mouth. In the second place the family is so distressed over the major pathologic condition that they forget the patient has teeth at all. Aren't these facts largely responsible for the fact that so many of the patients have very bad mouths?

*E. A. Thomas:* Yes.

*Davis M. Lewis, Lake Forest, Ill.:* What percentage of the patients were edentulous?

*E. A. Thomas:* In our hospital, we haven't determined the percentage of edentulous mouths. There are people in this hospital that were on my ward twenty-five years ago, and they have some old fragments of teeth yet.

*Weston A. Price:* Do you find heredity a very important part in this problem?

*E. A. Thomas:* You can get my percentage of heredity pretty well from Table 3. We must know our patients and their history.

# SOME FACTORS IN ROOT-CANAL TREATMENT*

By J. R. BLAYNEY, B.S., D.D.S., Chicago, Illinois

(Read before the Chicago Dental Society, April 15, 1924 and before the Oregon State Dental Association, Portland, Oregon, June 11, 1924)

TODAY, one of the important phases of dentistry is the evaluation of conditions found in the mouth as they are related to the health of the patient. I believe most of us are ready to admit that the deleterious effect of all pulpless teeth on the health has been somewhat exaggerated. As a result of this exaggeration, we have come to appreciate the importance of maintaining a vital pulp, and, when the pulp is exposed, to remove it in such a way as to prevent subsequent changes in the periapical tissue. There is no doubt that the period of radical extraction is over. However, that does not mean that all pulpless teeth should be saved. The dental profession must ever be on its guard to prevent the pendulum's swinging backward to a dangerous position.

Root-canal cases may be divided, roughly, into two main classes: those in which the periapical tissue is involved, and those in which the periapical tissue is not involved. In the past, we have been chiefly concerned with the disposition of the first class of cases rather than that of the second. The second group is by far the more important. All teeth with involved root ends could be extracted without doing a great deal of harm if we had develcped our technic of treating all teeth with healthy root ends, in a degree to prevent pathologic areas surrounding the apex. The primary issue is a determination not of methods of treating infected roots, but of how to remove a vital pulp and maintain a healthy periapical tissue. It is toward this second class, namely, those in which the periapical tissue is not involved, that I would direct your attention, referring to the treatment of chronic root-end infection, only to show you what we have found in reviewing our cases.

In the past, the majority of root-canal treatments have been carried on under extremely unfavorable conditions. Indifferent methods of treatment are at least partially responsible for the unsatisfactory results obtained. Whenever a root-canal is to be treated, the first step is to establish asepsis; for without surgical cleanliness, the results will be discouraging. If we are not willing to accept this requirement, I believe we should not attempt pulp removal, as our work must be aseptic rather than antiseptic. There is no single method for establishing asepsis that will be applicable to all offices, although the principle is the same in all cases, with only the details to be worked out by each operator in accordance with the conditions in his office.

*From the Department of Therapeutics, University of Illinois.

I have found the following plan very efficient and simple.[1] A small formaldehyd cabinet having two or three removable shelves is used to keep all root-canal instruments in a sterile condition. Each shelf is equipped with a complete outfit, so when we are ready for an operation, a shelf is removed and placed on the bracket, which serves as a sterile operating tray. All instruments are thoroughly scrubbed and boiled before the tray is arranged and replaced in the cabinet. The dressings are sterilized by steam; the guttapercha cones are sterilized by immersion in tincture of iodin, then decolorized by alcohol, and finally placed in a bath of alcohol until used. This is done by the assistant without the attention of the operator. Treatment is undertaken only after the dam is in place and the field of operation painted with tincture of iodin. The operator's fingers never come in contact with the working ends of the instruments or the dressings.

The office equipment need not be elaborate in order to carry out these principles. There are a number of steam chests on the market that will serve the purpose for dressing sterilization without the outlay of a large sum of money. Each tray of the cabinet should be equipped with a complete assortment of instruments used in this type of work. This plan of keeping the root-canal instruments in a cabinet by themselves and separate from the regular instruments cabinet has been found most desirable.

## Diagnosis

Rational treatment is based upon the recognition of the existing pathologic condition. The application of therapeutic procedures without a clear cut idea of the pathologic process in the pulp and periapical tissue will be sadly empiric. Following repeated attacks of acute hyperemia, the endothelial cells lining the blood vessels of the pulp lose their power to respond to the impulses of the vasoconstrictors and remain permanently dilated even between the periods of pain.[2] When this occurs, we have chronic hyperemia, which demands immediate removal of the pulp. During the repeated attacks of pain, the cellular elements of the blood are forced through the vessel walls into the tissue, and areas are found in which the red blood cells are breaking down. Chronic hyperemia of the pulp is followed by inflammation and suppuration after exposure, and even if exposure is prevented by treatment of the cavity, it will undergo degeneration. Whenever exposure occurs, the pulp is inflamed, and a chronic suppurating course follows, extending along the lymphatics. There is often a definite line of demarcation between the normal and the inflamed tissue.[2] In some cases the interim is quite small between the time of exposure and the death of the pulp. This is due to the type of the invading organism and the resistance of the individual. It is of utmost importance that the different conditions of a vital pulp be noted when the case presents, as we have found this has a direct bearing on the end results. An exposed pulp is an infected pulp, and it will show a small area of inflammation on microscopic examination even, though no symptoms have developed.[3] This has been known for some time, but only a few years ago, we found that an antiseptic must be sealed over the exposed area prior to the removal of the pulp, if we wish to prevent periapical tissue change after our

1. Coolidge, E. D.; in Ward, M. L.: American Text Book of Operative Dentistry, Ed. 5, Philadelphia, Lea and Febiger, 1921.

2. Noyes, F. B.: A Text Book of Dental Histology and Embryology, Including Laboratory Directions, Philadelphia, Lea and Febiger, 1918.

3. Black, G. V.: Special Dental Pathology, Chicago, Medico-Dental Publishing Co., 1916.

treatment.[4] Cases may present the following conditions of the pulp and periapical tissue:

Dental Pulp or Root Canal:

1. Vital normal (covered by sound dentin)
2. Vital hyperemic
3. Vital exposed by caries (always inflamed)
4. Gangrene
5. Previous root filling

Periapical Tissue

1. Normal
2. Acute abscess
3. Simple granuloma
4. Liquefaction necrosis
5. Infection cyst

When a case presents a vital exposed pulp, the periapical tissue may be either normal or there may be some tissue reaction taking place beyond the root end. The latter usually is the case when the pulp has been exposed for some time. Again, it is possible to find a gangrenous pulp with any of the different types of changes in the periapical tissue. The diagnosis of the root-end conditions cannot be completed without the aid of the roentgen ray, so whenever a tooth requires pulp treatment, we obtain a roentgenogram at the first sitting, so we may know the condition of the periapical tissue. This is very necessary in checking the progress of the cases at the time of subsequent examinations.

In making a diagnosis, the general health and age of the patient should be taken into consideration, as well as the condition of the investing tissue of the tooth in question. We must always consider the local problem of root-end infection from the standpoint of the patient's health and not purely from a tooth aspect. Root-canal treatment has been studied from purely a mechanical standpoint to the exclusion of all consideration of cell reactions. Biologic principles are the basis of all therapeutic treatment.

4. Blayney, J. R.: Clinical Results of Pulp Treatment, J. A. D. A., 9:198 (March) 1922.

## Treatment

The technic of root-canal work can be divided into mechanical and therapeutic treatment for the convenience of description. Therapeutic treatment is to establish and maintain aseptic conditions along the surface of the canal. In selecting drugs to be used in the canal, one must always be mindful of their effects on the periapical tissue should they escape through the foramen. The use of caustics in the canal should be avoided. We would not ask Nature to resist chemical necrosis as well as infection. Undoubtedly, much harm has been done to the surrounding soft tissue by the use of coagulating drugs, as well as by mechanical trauma from instrumentation. The sterilization of an infected root canal is not accomplished by drugs alone, but by a thorough mechanical removal of organic débris and softened dentin and by ventilation and drainage, combined with the judicious use of nonirritating antiseptics. We sterilize only the surface of the canal and not the entire tubular contents of the dentin, as this is accomplished only by removing the tooth and boiling.[5] The day of strong germicides and disinfectants in root-canal treatment has passed, and I believe that caustic drugs, when sealed in a canal, will irritate or destroy periapical tissue. Prinz[6] says that an agent to be used in the canal should be in accordance with the following rules:

1. It must be able to develop the highest degree of antiseptic power without doing harm to the periapical tissue.
2. It must maintain its activity at least twenty-four hours when sealed into the root-canal.
3. It must not cause pain.
4. It must not discolor the tooth structure.

5. Prinz, H.: Cosmos, 61:954, 1919.

6. Prinz, H.; in Ward, M. L.: American Text Book of Operative Dentistry, Ed. 5, 1921.

### Treatment of Teeth With Periapical Disturbance

In cases of root-end disturbance, a number of factors must be taken into consideration before the final decision to treat or to extract the tooth can be made. The tooth is never to be considered by itself, but always from the standpoint of health. The final diagnosis is determined in view of the general health and the age of the patient, the ease of opening the canal to the foramen and the willingness of the individual to cooperate, in order that the case may be followed and the progress watched. It is to be understood that in all cases referred to, the conditions are present in the mouths of supposedly healthy individuals and not in those of hospital patients. The resistance of the individual must be nearly normal if favorable results are to be expected.

The premise upon which all teeth so involved are treated is that the fibers that are attached to the cementum are still vital. Noyes[7] says that when an infection passes from the pulp to the surrounding tissue, it does not spread along the surface of the root, but passes out between the fibers, following the course of the vessels, especially the lymphatics, and that the first inflammatory area is in the portion of the periodontal membrane nearest the bone, toward which the infection spreads more rapidly.

In the treatment of all cases with root-end changes, we aim first to reduce the virulence of the infectious matter in the canal. Should the case in hand be an acute abscess, an incision is made to establish free drainage, and the acute symptoms are allowed to subside. The rubberdam is applied, and, with sterile instruments, the pulp chamber is thoroughly opened; all carious material is removed from the cavity, and the canals are brought into full view. No attempt is made to enter the canals at this time. Any entrance into the canal at the first sitting is liable to force infectious material through the foramen into the periapical tissue. A small pellet of cotton moistened with cresol (U. S. P.) is placed on the floor of the pulp chamber and the tooth is sealed without pressure. The first sitting is the same in all cases of gangrenous pulps or previous root filling, regardless of the pathologic condition of the periapical tissue.

In case of suppuration, after the contents of the canal have been mechanically removed and the secretions absorbed, the canal is flooded with a 5 per cent solution of dichloramin-T, a pumping motion and the warm air being employed to bring the solution into direct contact with all parts of the canal. The excess solution is removed, and a paper point charged with dichloramin-T is sealed in the canal for twenty-four hours. This solution yields nascent chlorin when brought in contact with wound secretion or organic material, and chlorin is one of our most active antiseptics. Any soreness or irritation following the application is due to faulty technic or to a spoiled solution rather than irritating effects of dichloramin-T. After about three or four treatments, at intervals of from twenty-four to forty-eight hours, the canal should be ready for filling. However, sometimes the canal may be filled with lymph, as dichloramin is a lymphagogue. This will subside if a dry sterile paper point is placed in the canal and allowed to remain forty-eight hours.

In cases with a simple granuloma or liquefaction necrosis, we have found that a combination of tincture of iodin and beechwood creosote, equal parts, gives the best results. A 1 per cent aqueous solution of iodin in normal salt is used to wash out the canal, and after drying a

7. Noyes, F. B.: Transactions Illinois State Dental Society, 1920.

dressing of tincture of iodin and beechwood creosote is sealed in the canal. In using creosote, one should always remember that it precipitates albumin; hence, the point of that cone should never be allowed to pass the foramen. If cases do not respond in three or four treatments of the foregoing type, we advise extraction, and examination of the root end usually reveals denuded cementum.

### Methods of Removing Vital Pulps

In removal of a vital pulp we have used pressure anesthesia by cocain; some form of local anesthesia, i. e., block, infiltration or intraosseous, and, in a very few cases, arsenic. Until three years ago, the method of choice was cocain pressure in all cases except those in which the molars were involved, in which we employed nerve block in the lowers and infiltration or intraosseous in the uppers.

In reviewing the material collected, we were surprised to find such a large percentage of our pressure cases with rarefied areas; to be exact 52 per cent of all the pressure cases were involved regardless of the character of the root filling.

In an effort to find some explanation for the large percentage of involvements, a careful study of each case history was begun. All cases were classified as to the condition of the pulp at the time pressure was applied. In one group were placed those in which the pulps were normal, or in which the exposures were accidental and made after the dam had been applied; in another group, those with pulps exposed by caries. When the results were tabulated, we found that practically all of those in the first group had a healthy root end, and when they did not, the condition was usually due to mechanical injury. After the results in the second group were compiled, an effort was made to find why some of them were normal, and it was found that, in some cases, a dressing of oil of cloves or phenol compound had been sealed in the cavity from one to two days prior to removal of the pulp.

Since a pulp exposed by dental caries is infected, the use of pressure anesthesia without first sealing in a mild antiseptic for at least twenty-four hours merely forces the infection along with the cocain, some of which will pass into the periapical tissue. Another point that is too often overlooked is the necessity of removal of all carious material from the cavity before the pulp canal is entered. We now have made it a rule, if the pulp is exposed, to use some form of local anesthesia, rather than cocain pressure; also, first to apply a dressing of some mild antiseptic for at least a day before extirpation, except when the exposure is made by a sterile instrument after all caries has been removed and the rubber is in place.

Another problem is: What effect does cocain hydrochlorid have on the periapical tissue? Cocain is a protoplasmic poison and "whenever a 5 per cent solution is injected hypodermically, it may result in death of tissue, which shows either as a necrotic area of the skin or a sterile abscess."[8] Often, an operator will use two or three one-twelfth grain pellets of cocain dissolved either in the drops of blood oozing from the exposure, or on a small pellet of cotton moistened with sterile physiologic solution of sodium chlorid. What concentration do we have when this is forced into the tissue fluids of the pulp, and what is the effect on the periapical tissue?

For the last three years, we have used some form of local anesthesia almost

8. Bastedo, W. A.: Pharmacology and Therapeutics.

exclusively. In reviewing these cases, I have found that 76 per cent of the cases followed do not show the slightest tissue change.

### Root Canal Filling

The object of filling a root canal is to maintain a healthy periapical tissue. As it is impossible to sterilize the entire tubular mass of the dentin, the inner ends of the tubules must be hermetically sealed in order to prevent infection or reinfection of the periapical tissue. We have been using chloropercha in connection with packing short sections of guttapercha cones in small canals, while in those with a large foramen, only guttapercha is employed. For some time, we believed it was best to have a small amount of the filling material pass beyond the foramen. However, today, as a result of checking over our records, we find a canal filled to within a millimeter of the root end is preferable to one overfilled. This does not mean that one can be careless and fill the canals for half their length, because, in so doing, the dentinal tubules are not sealed, which permits reinfection. In studying cases in which the canal was overfilled, we usually find, in from six to twelve months, a small area of granulation tissue immediately surrounding the mass of guttapercha, which has been caused by the irritation of the material on the soft tissue. These areas are not primarily infected, but they may become infected at any time.

The studies of the tissue of root ends by Grove and Hatton have given some very valuable information. Grove has shown the periodontal membrane dipping down into the foramen and completely surrounding the vessels and nerve trunks to the pulp. Noyes has stated that the true pulp tissue ends at the dentocemental junction, and that the bit of tissue in that portion of the canal formed entirely by cementum is a "conducting connecting tissue." Again, Grove[9] contends that if this tissue in the foramen is not disturbed during pulp removal, Nature will seal the canal by a deposit of cementum. Hatton[10] writes as follows:

> There is nothing remarkable about such a closure. In the smaller accessory foramina, such a closure seems to be the rule, but it is much more rarely found in the larger principal canals.

Elsewhere he states that this calcified material resembles cementum rather than dentin, or that it may be quite amorphus.

### Occlusal Restorations

Another interesting point is the effect occlusal restorations have on the periapical tissue. This is a factor that seems to have gone unnoticed in the past.

About two years ago, I observed some cases in which root-end involvements were developing that could not be readily accounted for. In a careful clinical examination of this case—a lower first molar in the mouth of a young woman—I found a large disto-occlusal amalgam restoration. Though the occlusal surface had been beautifully contoured, I observed several highly polished areas indicating that the filling was too high and that the tooth was receiving occlusal stress. The patient informed me that the tooth felt high for a few days after the filling had been inserted. With a small stone, the filling was relieved in the highly polished areas, and the patient was asked to return when she received the next notification. In six months, another clinical examination showed that the tooth was not receiving undue stress, and the roentgen ray showed that the tissue surrounding the root end had returned to normal.

I recall a case of a medical student who came to the infirmary for treatment. In the routine examination, we found a lower first molar that had been crowned, and the roentgen-ray examination revealed a small bone destruction at the end of both mesial and distal roots. The diagnosis was a gangrenous pulp with a granuloma. After the crown had been removed and during the opening of the tooth in order to approach the pulp chamber the patient insisted he was experiencing pain Presently, the pain became so severe that we

9. Grove, C. J.: Cosmos, 63:968, 1921.

10. Hatton, E. H.: J. A. M. A., 71:1549, (Nov. 9), 1918.

had to use local anesthesia. When the pulp was exposed, the clinical conditions were found to resemble those of a vital pulp. The patient explained that the tooth had been high and sore for the first few months after the application of the crown but had been comfortable since. Soon after treatment, the student graduated and left the city, and so I have been unable to follow the case.

We have many cases in our files with a similar history, and it is our belief that faulty occlusal restorations may be responsible for some of the root-end changes following treatment. We often hear of occlusion causing changes of the periodontal membrane in the gingival region, and if this be true, as I believe it is, it does not seem illogical to presume that we might find cases with root-end changes.

## Summary

1. A serious effort should be made to determine what clinical procedure will prevent tissue change after the removal of the pulp.

2. All operations must be performed in accordance with surgical technic.

3. Diagnosis of the pulp, periapical and gingival tissues should be made and recorded before beginning treatment.

4. The use of coagulating drugs should be discouraged and only the mildest antiseptics employed.

5. In removing exposed vital pulps, it should be remembered that the pulp is infected and that an antiseptic is to be sealed directly over the exposed area prior to its removal.

6. The use of some form of local anesthesia is preferable to cocain pressure.

7. The periapical tissue should not be injured by chemicals, instruments or an excess of filling material. No instrument should penetrate the foramen.

8. The constricted area at the foramen should not be enlarged. It is an important aid in preventing injury to the soft tissue.

9. The occlusion should be carefully checked in order to prevent possible injury to the periapical tissue.

10. Accurate records of all cases should be kept in order that a check may be made of the progress of the cases.

## Discussion

*Edgar D. Coolidge:* There is nothing in the whole presentation to which I can take exception because Dr. Blayney and I agree on all these things. The most important thing is to prevent these areas from developing rather than how to cure those that have already developed. That point was not brought out. And yet Dr. Blayney has shown us some splendid slides on the correction of these areas. Their correction is very interesting both to observe and to attempt; but the most important thing is to know that the fillings we put in are not going to cause these areas to develop later on.

I think a large percentage of those who fill root-canals dismiss a case from memory practically as soon as the case is complete and do not follow it from year to year to see whether these areas develop or not. The fact that a tooth is comfortable and the patient does not complain of it does not excuse us from the responsibility of the case, and we should check those cases up year after year and tabulate the results in order that we may know whether our technic is correct or whether we are making failures. It is discouraging if we make mistakes, but the only way we can correct them is to learn where they are and to make such correction as is necessary to overcome them.

The fact that Dr. Blayney has followed these cases and can show us the results and the tabulated statistics of these results is the thing that makes his talk appeal to us. It is not guesswork. It is based on results that he has tabulated, and those are the things that count. We can assume, we can estimate or we can guess at these things, but we can't prove them without having tabulated results.

I wish to lay a great deal of emphasis on the point that everyone who assumes the responsibility of treating root-canals should also assume the responsibility of at least trying to get the patient back from time to time for the purpose of making examination and tabulating the results. It takes a little time, but it is time well spent for our own information and for the patient's health.

Dr. Blayney spoke of a number of things that might cause these areas to develop in the cases in which we start with a good healthy periapical tissue. Now, there may be healthy periapical tissue around the end of a tooth with a dead pulp, or one that has an old root-

canal filling in it that we remove and replace, or around the end of a root containing a vital pulp that must be removed. The class of cases in which the periapical tissue is healthy may be present in one of those three conditions; and they must be treated in practically the same way, with the same degree of care not to injure the periapical tissue in the various ways which were enumerated: by mechanical injury, trauma, injury by drugs, injury by trauma through the mechanical cleansing of the canal with the broaches and, finally, by overfilling. They are all exceedly important points.

I want to emphasize also another point to which attention was called in regard not to enlarging the foramen. In all of the cases in which the periapical tissue is normal, the importance of leaving that foramen small cannot be overestimated. When the broach goes through the end of the canal into the healthy tissue, injury results. Every time we carry the broach through the end of the canal into the tissues, we are liable to force through a little of the material that is in the root, which may be infected; or, at least, there will be a mechanical injury. Every time the broach goes through the end of the root, it enlarges the end of the root a little and makes the chances of the root-canal filling going through that much greater. If it were possible to leave the apical constriction when cleaning and enlarging the canal and then fill it to that point, we would have the ideal filling. That is what we should try for, and try to avoid the overfilling.

There is a great deal of effort made to save teeth that ought to be extracted, sometimes because the patient insists and perhaps because there is a tendency to do all we can to save a tooth, and there is no objection to it as long as the patient is willing. But it is discouraging to both the patient and the operator unless a proper understanding of the uncertainty of the result is had with the patient beforehand.

I would rather see a man extract a pulpless tooth than to make the attempt to save it and become discouraged and have his patient become discouraged, and then come to the conclusion that root-canal work does not pay. I believe that is one of the things that has caused discouragement in root-canal work. Root-canal work is not discouraging in the cases that are hopeful when treatment is begun. It is not easy, but it is not discouraging. The results are encouraging. So if we will follow the outline as Dr. Blayney has given it, and attempt to make a careful diagnosis; and, in all cases in which it is advisable to treat a tooth, use those precautions that he has outlined for us, we will have good results. And in those other cases if we are careful to make such experimental cases purely experimental and follow them up as he has shown us on the slides, we will soon have a list of cases in our files to which we can refer that will tell us what our results are.

It is not necessary that we have exactly the same method of handling every case that comes to us, but it is necessary that we handle every case carefully. I think that this is more important than that we handle them exactly the same way. One may vary a little bit and yet get good results. But if every step is carefully made and asepsis is assured, we are pretty sure to get good results.

*Lucien H. Arnold:* I agree with Dr. Coolidge that the particular methods are not nearly so important as the particular effort that is used. Root-canal work is not so much a matter of methods and materials as it is of honesty and thoroughness in service rendered. When the profession at large realizes that, we will have fewer "one hundred percenters" and more skilful dentists.

Dr. Blayney has had a great deal of experience with students, and his experiences merit much consideration and study. He says that he is not in private practice. Private practice and the practice met in colleges differ very materially in many respects and the conclusions reached may also vary greatly.

Dr. Blayney said first that the period of radical extraction is over. It should have been over a long time ago I am strongly tempted to take a little fling at the "one hundred percenters." Their attitude toward root-canal therapy has always aroused my anger. If these zealous extractors had been taught and had followed thorough, careful, honest technic, irrespective of the materials they used, there would not be so many one hundred percenters.

Dr. Blayney has divided root-canal work into two classes, those involving periapical disturbances and those not involving them. That is a very good classification, although perhaps another will also be of service. The classification of cases I shall use is as follows: Class 1. Root-canals containing living tissue. Class 3. Those cases that we sometimes run across (the so-called "dry holes") which formerly gave us a bad case of hysteria whenever we saw them. They almost invariably flare up, presenting as they do aerobic microbes. Deprived of oxygen, on opening, they receiving the needed oxygen spring into prompt activity. Class 2. All cases not

included in Classes 1 and 3, cases having infection.

My particular work engages me with Class 2 and Class 3. Class 1 does not come my way. Only one pulp has been destroyed in my office in several years, and that was done in a referred case, on demand.

If Dr. Blayney can destroy the infection in a pulp by sealing oil of cloves over the exposed area so that it is safe to use pressure anesthesia, why destroy the pulp? Of course, if part of the pulp is gone, the rest of it must come out. I have no faith in pulp amputations. In many cases that come to our attention infection seems imminent. In those cases, Dr. Blayney will agree with me, the sensible thing to do, if you can, is to bring back a healthy condition with the use of hot oil of cloves or what not, as can often be done; and then to seal the teeth up for six months with some good protective seal and in six months have the patient come back. If they return with no history of trouble, it is safe to cap the pulp. If the roentgen ray shows that these treated pulps are in proper condition after six months, permanent tooth fillings are justified; that is, in a large number of cases.

In all cases, an examination is made by roentgen ray before treatment is started. After the canal is filled, the roentgen ray determines whether the work has been safely done. That is part of the treatment just the same as treating or filling.

Dr. Blayney spoke of the health and age of the patient. The health of the patient, to my mind, is a very important consideration. A patient with genito-urinary infections can be treated with the same assurance as a patient in good health. Failures are much more common with patients in that condition; also in the case of patients with an infection of the renal capsule, and in tuberculous cases. They haven't the stamina to throw off infections around the apex that the ordinary patient has. Tell these patients there is a chance they are going to lose, and it is their chance and not yours.

As to trauma caused by overfilling and by instruments, there is a lot of leeway, especially at the apex. We frequently puncture the tissues around the apex without any lasting harm resulting. But I am speaking about Class 2 and Class 3, while Dr. Blayney talks more about Class 1. My work is with canals that have been infected for some time, and almost invariably there is an area around the apex allowing latitude to slip an instrument through and touch nothing except perhaps some infected fluids. Consequently, Dr. Blayney may have a different idea than mine, and his is right in his cases and mine is right in mine, although we may disagree.

The sterilization of root-canals is not a mechanical operation alone. It is not a medical operation alone. It is principally a chemical operation. The products of all decomposition of flesh contain sulphur. When the pulp putrefies, there is invariably a sulphur compound left, not only in the root-canal, but in the tubuli of the dentin as well. Dr. Blayney says the only way to sterilize the dentin is to take it out and boil it. It can be done by burning as well. The hope is to sterilize every tubule clear to the end. That perfection we have not reached yet, but we can sterilize at least a part of the larger tubules even with the tooth in the mouth.

These products of decomposition that fill the tubule as well as the canal, being sulphurous in composition, will invariably yield sulphurated hydrogen when hydrochloric acid is added. Hydrochloric acid is a very decided coagulum, but has been used in thousands of canals, and without any harm. Hydrochloric acid if chemically pure must be diluted with water 50 per cent. At the same time, it liberates nascent chlorin. The sulphureted hydrogen has a strongly offensive odor and that odor always indicates, when following the introduction of diluted hydrochloric acid, that infection is being overcome. The nascent chlorin liberated is one of the best sterilizing gases we have, and this helps much in sterilization. The use of hydrochloric acid should be continued as long as the offensive odor persists. The canal has not been dried. Nothing has been done to it, except to put the rubberdam on and introduce diluted hydrochloric acid.

As long as hydrochloric acid can be introduced and sulphureted hydrogen liberated, we know positively that the root canal is not sterilized. Just the minute there is no odor, we know that the canal is sterile chemically. To that extent it is ready to fill, chemically; not physiologically, however, because there is more or less pain going to follow if it is filled immediately.

Now, Dr. Blayney and Dr. Coolidge both stressed considerably the damage done by forcing medicaments through the apex, and that is true of Class 1 canals. I am talking about Classes 2 and 3. Class 3 I throw right back into Class 2 by using hydrochloric acid when the canal becomes "moist infected." As the pulp dies, fatty degeneration takes place; there are little globes of fat laid down in the tubules, perhaps close to the canal end of the tubule, or it may be close to the dento-cemental junction end or anywhere between. These fat dams wall off that part of the tubule

beyond the dams. Whether that part is sterile, we cannot say. The fat itself is sterile. If we can fill up the fat dam, we are doing well. Occasionally, we can fill some of the largest tubuli part way. We can, however, sterilize them absolutely.

This action between hydrochloric acid and suphur bearing fluids is energetic. It is an active chemical action. It is not mechanical. Simply give hydrochloric acid a chance to go in the canals and it goes into the tubules of its own volition. Finally, we get a uniform compound with the sulphur and hydrogen and chlorin all eliminated. Then the safe thing to do is to seal the canal with a mild antiseptic and let it go for three, five or six days, at one's convenience.

Just a word of caution, especially in regard to the molar teeth: I have been seriousiy disappointed in finding a good deal of soreness when I have used guttapercha for a seal, especially if the cavity opening is large. The trauma of occlusion pounding down on that guttapercha produces a pumping action on the very small area at the apex and a mechanical irritation ensues that will cause a marked soreness of the tooth. In most of these cases, it is better to seal with cementum.

Leaving the filling too long is a great possible factor of trouble. A few months ago, a physician from Wisconsin said, "You made a bad bull of this molar tooth of mine." And it was very loose. Closer inspection disclosed some of Dr. Blayney's highly polished "mirror marks." The filling was shortened radically, and six or eight months afterward, the tooth was as tight as any other. It had nothing at all to do with the root canal. Those things must be watched, and trouble that belongs elsewhere should not be laid to root-canal operations.

Now, as to the effect of caustics in the periapical space: There is something to be said about what is produced in the periapical space. In Classes 2 and 3, we generally have infection at the end of the root. It is an infection without question.

Hydrochloric acid can be forced through the apex into the infected periapical space, with benefit rather than harm. Surprising as it may seem, it seldom causes much discomfort. That would not have been believed some years ago. It is proved now. The thing that happens is that hydrochloric acid combines there as elsewhere with the sulphur and generates sulphureted hydrogen, and that works out through the root canal. The products left are chlorids. Chlorids are normal to the body and are taken care of without any particular trouble.

If sulphuric acid is used, however compounded, sulphates are produced. Sulphates are foreign to the body and cause an effort on the part of the system to take care of them. Do not be much alarmed about forcing hydrochloric acid through.

At the second opening of the canal after the primary treatment, sterilization is necessary but does not need to be as thorough as the first. This is followed with alcohol, which will do the same thing that the hydrochloric acid did with the sulphur. The alcohol will diffuse into the chlorid solution in the tubuli, and in the supernumerary canals at the end of the root. The surplus alcohol is blown out and more alcohol pumped in, and the strokes are counted. We measure the probable depth to which materials are carried by the number of strokes used. In the canals in Classes 2 and 3, it is not so important to avoid a little overfilling.

The Kenwood Root Canal Unit has a slogan: "Just to but not through, but rather through than not to the apex."

In Class 2 and Class 3 cases, there is always a space around the apex filled with infected substances. Should a canal not be filled clear to the apex, the contents of the open root end will become infected from the surrounding infection in spite of all that can be done. This protected and infected space in the root end will then become a nidus for further infection of surrounding tissues and its very shape will preclude the possibility of disinfection either by Nature or artifice. Therefore, it is better to have a little sterile material forced through the apex than to leave a vacant space at and near the apex which Nature cannot in any way cleanse.

In the past several years, it has been found unnecessary to enlarge a root canal for the purpose of filling it. It is too big as it is. All root-canal-filling lubricants shrink. Guttapercha, however, when put in cold, without any softening agency or material whatever, does not shrink. Since lubricants shrink, the larger the root canal the more the shrinkage; and the more shrinkage, the more danger of future infections.

If a root-canal technic is used that requires drying of the root canal as a preliminary step, trouble will follow because the root canal can never be dry except when taken out and dried in an oven.

After hydrochloric acid, followed with alcohol, is used, subnitrate of bismuth and candellila lubricant are used, the latter merely for the purpose of uniting the particles of subnitrate of bismuth into a ball so that they cannot by any means become diffused into the circulation and cause possible thrombosis if the worst should happen. Candellila wax does

shrink, but is composed only one-fourth of the lubricant. Subnitrate of bismuth, which composes three-fourths of the lubricant, does not shrinks; three-fourths does not shrink at all; one-fourth does in spite of us.

The guttapercha cone we use is cut square on the end. It is cut a little too large to go to the apex and is forcibly driven to the apex. It is, therefore, condensed as it is driven. The guttapercha put in cold expands a trifle when it comes to the blood temperature and does not shrink back. That makes up for any possible shrinkage in the lubricant.

*Dr. Blayney (closing):* Dr. Arnold mentioned pulp capping. A pulp that is exposed by dental caries is always infected, and part of it is destroyed. I have yet to make the first microscopic section of a dental pulp that has been exposed by caries that does not show definite tissue destruction. A pulp that is exposed by caries in an adult must be removed.

A good many years ago, Dr. Black laid down some principles for pulp capping that I believe were almost classic. We have been attempting to follow our cases of pulp cappings for a period of about three years, and I think the results will coincide exactly with the laws laid down by Dr. Black. If a pulp is exposed by caries before complete calcification has taken place, we may try pulp capping. If a pulp is exposed by caries after complete calcification has taken place, capping is a failure. In fact, Dr. Black stated that 14 years of age was the limit for a successful pulp capping. Never cap the pulp if it is exposed by a dental bur under any consideration, because there you always produce more trauma.

I made a statement in the body of the paper quoting Dr. Noyes, in which he says that when infection passes from the root canal into the periapical tissue it does not spread around the surface of the root but passes between the fibers toward the bone, and that the first portion of periodontal membrane showing an inflammatory condition was that portion nearest the bone. The basis for treatment of chronic root end infection depends on vital fibers still being attached to the root end. Maybe their outer ends have been destroyed, but the inner ends are still vital and still attached. A tooth that does not contain vital tissue attached to the apical cementum never yields to treatment. We are not always able to determine roentgengraphically whether or not we have a denuded cementum.

Now, granting that it is an infected area, if we force caustics through the root canal, we are going to destroy the remaining, periodontal membrane fibers that are attached to the root end, thereby defeating our very purpose in treating that type of case.

We all know that a good surgeon has a great deal of respect for tissue. You might say that respect for tissue is the basis of all modern surgery. If we mechanically cleanse and sterilize the surface of the canal, we can and should leave it to Nature to cope with and destroy the infection that is within the soft tissue. I think that is the place where we have made our mistakes in the past, attempting to sterilize, to cauterize, if you please, all that area surrounding the root end.

# SCIENCE AND CITIZENSHIP

By HENRIK SHIPSTEAD,* D.D.S., Washington, D. C.

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

THE scientific man has a particular duty to his country not enjoyed by the average citizen. This comes from the fact that his mind is trained to deal with the problems of a nation from the standpoint of science.

When we recall what science has done in the development of industry, and in the field of prevention and cure of diseases afflicting the human body, is it not reasonable that, by the application of the scientific point of view to problems of government, great results can be looked for? Science tolerates nothing but truth. In industry, it has eliminated and is constantly eliminating waste.

When a certain type of industrial machine becomes obsolete, science will not tolerate its deification and continued use but forces it to the scrap heap. When a manager is inefficient or holds a job because of pull or because of the owner's ignorance, science comes along and gives him his discharge. Science has taken the waste of industry and converted it into dividends. It is gradually promoting the laborer in industry from the position of being a machine to the more desirable position of being the caretaker of a machine.

Since true science has been applied to the task of preventing and eliminating diseases of the human body, wonderful progress has been made. It has isolated the micro-organisms causing the various diseases afflicting the human body. It is not necessary to here enumerate the many revolutionary changes that science has brought about in the treatment of these diseases. It discarded the old shin plasters and ill-smelling liniment and unearthed the cause of disease, and, by removing the cause, removed the disease.

In treating the disease of the body politic, we are still in the plaster and liniment stage. We have not as yet been able to isolate and annihilate the micro-organisms of corruption in our city, state and national governments. We are still using shotgun prescriptions, bread pills and quack panaceas. The world today is a very sick patient, like an old man afflicted with all the chronic ailments peculiar to his kind. The quacks that have had charge of this patient for the past generations have been applying their liniments of public debts and plasters of bayonets, and of course the patient's condition is gradually growing worse, and unless scientific methods of diagnosis and treatment are resorted to and applied, the patient will probably die.

The trained scientist, the economist, the engineer, must displace the politician in government. Science must do for

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government what it has done for industry and medicine. The members of the American Dental Association have a scientific training that can and should be applied in performing our duties as citizens of a great republic. With our training in science as a foundation and with a scientific point of view, it is peculiarly our duty to help diagnose and eliminate the ills afflicting our common country. We have been treating the symptoms instead of looking for the cause and its elimination.

The old saying, "Eliminate the cause of disease and the patient will get well," can be applied to the diseases of government as truly as it has been applied in treating the human body. Our entire course of instruction was more than a preparation for the practice of dentistry: it was the foundation upon which to build a philosophy of life and a foundation upon which to build a life of service to the nation as a citizen.

In the chemical laboratory, we learned that things are not as they seem; that the label does not always indicate what is in the bottle and that you cannot always tell what the next reagent will reveal. This should teach us to have an open mind.

In operative dentistry, we learn that concentration and plugging away will force gold into the cavity of a tooth, or an idea into the cavity of a human cranium. In dissecting the human body, we learned, or should learn, a greater reverence for our Creator than we had previously acquired from reading the book of Genesis. In our course in ethics, we had a weekly revised edition of the Sermon on the Mount. In the laboratory of physics, we learned the meaning of cause and effect, and this applied to history shows us that certain things happened today because certain things happened yesterday. Therefore, knowing what happened in the past, we can, to some extent, determine what will happen in the future.

Our course in biology should prove that an earnest search for the truth will be richly rewarded with knowledge, a development of life as unfolded in the book of Nature; and so will bring us into a closer understanding with the Creator and the forces that control Nature.

Pathology teaches us the dire results of chronic irritation and the necessity for the removal of the irritant. Surgery tells us the necessity for the elimination of pus, or corruption, as it was called in the olden days. It tells us the necessity for its elimination that it may not destroy the host.

Applying this idea to the elimination of corruption in government, the same conclusion is arrived at, that unless corruption is eliminated, the life of the host is in danger.

The bacteriologic laboratory teaches us the importance of micro-organisms or "little things." Histology teaches us the importance of the nucleus, that any organism or organization, in order to accomplish anything, must have a nucleus or "center of life." Physiology teaches us that the proper functioning of the individual cell in the human body depends on the healthy physical condition and environment of the individual cell.

It is only a step from this truth to the other one that the usefulness of the individual human being as a citizen is influenced by the condition of his health and environment. Hence, the necessity for measures protecting the health of the individual, in order that public health in the mass may be protected, healthy functioning of the individual in the body politic being induced thereby.

But science is not enough. A man, to be a useful citizen, must be more than a

scientific man. A man with a scientific mind can be a very dangerous citizen unless his science is controlled by a high sense of moral responsibility. It seems today that science, to a great extent, has been and is mobilized for destructive purposes.

The great gift of the Creator to man, "the power to labor" with brain and hand to discover and bring forth new truths and create new things, would seem too often to have been regarded by man not as a sacred trust to be discharged as such to humanity, but as the private, personal property of the individual to be commercialized and sold on the auction block to the highest bidder for profit.

This is not considered good ethics in the learned professions; but can we have for learned professions a code of ethics different from that governing finance, industry and politics?

If America is to carry out its historic mission in the world, it must settle this question in a way different from that which other nations have answered it. The condition of the world today is a tragic warning to humanity that nations, like individuals, must pay for their mistakes. "The children must pay for the sins of the fathers." That is the tragedy of life, that it is the children who must pay.

The world is suffering for having subscribed to the philosophy of the "tooth and the claw" that "to him who is strong, swift and cunning, belongs everything he has the power to take." This is the philosophy of the wolf pack, the philosophy of the jungle.

Science, unbridled by morality, says that, in the struggle for existence, the fit survive, and then blandly assures us that only the strong, the swift and cunning are "fit."

Morality, however, steps in and questions science's definition of those who are fit.

The tiger is stronger, swifter and more cunning than the cow, but does that prove it is more fit to live? The shark is stronger, swifter and more cunning than the horse, but does that prove the shark more fit to live?

Men who profess this philosophy have had control of the white man's civilization for several decades, and they have used their power over science to mobilize it for the destructive purposes of war and are so destroying the white man's civilization, and the interesting thing about it is that, while they are destroying this civilization, they tell us that they are only preserving, guarding and defending it.

The American system of government was founded on a different philosophy. It was founded on the principle that the government should be owned by the people themselves and used by them as an instrument for establishing justice, promoting the public welfare and guarding the rights of the people; that all people should be equal before the law; that the strong, the swift and the cunning shall not take everything they have the power to take, uncurbed by law. This is America's historic mission, and if America is kept true to this mission, and if we as citizens can keep America true to that mission, we shall be keeping faith with coming generations and they will call us blessed.

# THE IMPORTANCE OF EARLY DIAGNOSIS AND TREATMENT OF CANCER OF THE MOUTH

By GUY AUD, A.B., M.D., F.A.C.S., Louisville, Kentucky

(Read before the Kentucky State Dental Association, Louisville, Kentucky, April 7-10, 1924)

WITH our present knowledge of cancer of the mouth we have reached a point where our chief hope in reducing the high mortality rate of the disease lies in acquainting the public with the seriousness of delay in securing competent medical attention, and in reenlisting the interest of the medical and dental professions in the necessity of an early diagnosis and prompt treatment.

In spite of the fact that cancer of the mouth, because of its location, is easily diagnosed in the early stages, the results of treatment have not been satisfactory, chiefly because physicians and dentists have not appreciated the importance of the treatment of precancerous conditions, and of diagnosing and treating early malignancy. In many instances, early lesions are not treated, or they are only superficially cauterized, or treated with radium or silver nitrate. The patient is then dismissed from observation, and these almost insignificant lesions gradually progress to conditions of hopeless malignancy.

The pernicious practice of "watchful waiting," so prevalent among many members of our professions in the past, and to some extent even now, has resulted in a greater loss of life than has followed the most radical surgical treatment. Every new growth, ulcer or fissure of the mouth that does not heal promptly, and remain healed, should be considered a cancer until proved otherwise. Following operation, patients should be kept under careful observation long enough for the operator to be reasonably sure that they are permanently cured.

In order to give you a clearer idea as to the appalling decimation of humanity by this disease, I should like to quote a few of the latest mortality statistics on cancer.[1] The figures, for the year 1919, are taken from the registration area, which then comprised about 83 per cent of the population of this country. There were 68,551 deaths from cancer actually recorded during this year. According to estimates of the best statisticians, 90,000 deaths from cancer occur each year in the continental United States. About 3,400, or 3.7 per cent, of these deaths are from cancer of the mouth, which is six times as prevalent in men as in women. Cancer is fifth among the more common causes of death and is apparently on the increase, since the recorded death rate shows about 2.5 per cent more cases each year. Nearly every civilized country shows a similar increase. Better diagnosis and recording of cases does not fully account for this increasing death rate.

Is there a "cancer age?" Strictly speaking, there is not. We know that infants and young people frequently die

1. Bureau of the Census, Mortality Statistics, Twentieth Annual Report.

of the disease. However, about 95 per cent of all deaths from cancer occur at ages over 35. At ages over 40, one person in ten dies of cancer. Deaths from cancer account for 5.8 per cent of the mortality of all ages. Largely because of neglect and ignorance, nine cases of ten are now fatal. While most of the responsibility for this rests on the patients themselves, it is, indeed, a sad commentary that a part of it is due to negligence of the dentist. If proper precaution and treatment were observed, it is probable that more than half of the 90,000 yearly deaths that this disease causes in the United States could be prevented.

Notwithstanding this enormous annual toll of human life, we are making progress in our efforts to eradicate cancer. Reports from the large surgical clinics show the percentage of cures to be increasing each year, which is gratifying in a condition that is otherwise hopeless. We are now able to measure rather accurately the degree of malignancy of a neoplasm by means of Broder's index. The basis of this index depends on the fact that the more a neoplastic cell tends to differentiate, or in other words, to approach in structure a normal cell, the lower is the degree of malignancy; and, likewise, the more malignant the tumor, the more undifferentiated or embryonic are the cells.

While real progress has been made in the prevention and cure of cancer, its cause remains largely a matter of speculation. The more popular theories as to its cause are: Virchow's theory of local irritation; Cohnheim's, of embryonic origin; Adami's, of habit growth, and Hanseman's, of anaplasia. Oschner[2] believes these theories aid in explaining the development of cancer, but in each instance the seed in the form of some form of infection is missing.

2. Ochsner, A. J.: Ann. Surg., 73:294 (March) 1921.

Every part of the body is made up of cells, and these vary according to the particular kind of tissue they compose. The various kinds of cells grow, perform their function and die, according to very definite laws of Nature. This process is going on continually in every part of the body. Sometimes, certain of these cells begin to grow and develop along lines which are not in harmony with their usual order. In other words, they become "outlaw cells" and refuse to follow the established laws of Nature. These lawless colonies may start up in any part of the body, such as the lip, cheek or tongue, and frequently form small nodules. All authorities agree that cancer is primarily a local disease; permanently curable, in almost every case, by removal of the incipient growth. The disease nearly always gives warning signals while in this local curable stage, and in a majority of instances is located in regions which are accessible to surgery.

We know that cancer often arises at the site of long continued local irritation. Some familiar examples of this are: the smokers' cancer; cancer of the lip from a protruding tooth; cancer of the cheek, gum or tongue from the irritation of ill-fitting plates, crowns or bridges, and cancer of the tongue from the roughened edge of a tooth. Many other examples might be given, but the foregoing will serve to prove the danger of cancer in tissues subjected to prolonged irritation. Many benign tumors, fissures, ulcerations and other apparently simple lesions, not cancers at first, may change into malignant growths. Constant irritation of the cheek from teeth that have worn sharp on their occlusal or crown edge frequently results in cancer. Teeth that are out of line, particularly the upper and lower third molars, are a source of constant irritation. In those who chew tobacco excessively, the teeth are frequently worn down to such an extent that a ridge develops along the inner surface of the cheek corresponding to the

occlusal surfaces of the teeth. This delicate tissue is constantly irritated in the process of chewing and is the site of many cancers. Such conditions are constantly under observation, and it is one's duty to bear in mind the serious consequences that might follow failure to relieve them. The modern dentist, who is truly a guardian of public health, sees much more than the teeth when he examines a patient's mouth. The operation for removal of these small growths is comparatively simple and leaves little or no disfigurement, while delay means a radical operation, which is frequently mutilating and dangerous and offers the patient much less chance of a permanent cure.

Once these seemingly simple growths have penetrated into the surrounding tissue, or cells from the growth have gotten into the blood-vessels or lymphatics, to be carried to distant parts of the body, there to take root and grow, the condition becomes hopeless, and the patient must pay the penalty for his procrastination. It is a pity that those incipient cancer growths are not painful. Countless lives and untold misery and suffering might be spared if those having such growths could be driven to seek relief early, as they do in case of toothache, which is seldom serious.

The quacks and unscrupulous fakers prey on the fears of these unfortunate people, whom they entice into their clutches by cleverly worded advertisements of "cancer cures" which do not cure. These poor uninformed and credulous sufferers are doped with drugs internally and pastes and lotions externally and are relieved only of the contents of their pocketbooks. Finally, after losing their best chance of cure, through delay, they come to the surgeon begging for relief from a condition that has become hopeless. Thousands of lives could be saved annually if we could teach the people that we know of no medicine that will cure cancer; that corrosives are worse than useless and in most instances only eat off the top of the growth and stimulate the base to grow more rapidly. Teach them that their chance of cure lies in the early and complete removal of the disease. The quacks and charlatans could not thrive as they do if they did not fool the people into believing that every growth is a cancer.

The roentgen ray and radium have proved of great value in the treatment of cancer. The clearly operable cases are best treated by surgery, followed if need be by roentgen ray or radium. There is a definite place in the treatment of cancer for surgery and for radiotherapy, and I do not think the one can be substituted for the other. Our best results are to come from a proper combination of surgery and radiotherapy, in selected cases. Roentgen ray and radium are of value in the preoperative treatment of certain cases; and in blocking the glands to prevent the spread of the disease; and finally, when operation has been delayed so long the condition is hopeless, a great deal may be done with these agents to prolong life and make the end more comfortable.

A large majority of fatalities in cancer of the mouth have resulted from delay in proper treatment due to lack of recognition of the disease in its early stages. Owing to lack of knowledge of the essential facts concerning the disease, part of the responsibility rests on the public for their delay in securing proper treatment; but, unfortunately, much of it is ours for unnecessary delay in making a diagnosis. Our chief hope in reducing the number of deaths from cancer lies in educational propaganda, which should reach both the medical and the dental profession and the lay public. How many times have we seen patients with cancer of the mouth in its early stages, when conditions were most favorable for a permanent cure, go to their physician or dentist for relief, only to be nursed along by inefficient treatment until hope-

lessly incurable, and often without any attempt having been made to make a correct diagnosis? Such a thing is unpardonable with our present knowledge of the disease. Again, the physician or dentist may give too little consideration to the patient's complaint, and thus allow a condition that might be easily relieved to develop into an incurable one. Perhaps he has not taken the trouble to excise a small portion of the growth for microscopic examination; which, after all, is the safest and surest method of arriving at a correct diagnosis.

There are many things that we should strive to impress on the minds of the people regarding cancer, a few of which I should like to mention briefly in conclusion: A large majority of fatalities in cancer of the mouth have resulted from delay in securing competent medical attention. Cancer is primarily a surgical condition, and in the beginning is always a local disease, which, by removal of the incipient growth, is permanently curable in almost every case. It is not a constitutional or "blood" disease; is not contagious; and, so far as we know, is not hereditary. The onset of cancer is usually painless and for this reason is especially insidious and dangerous. There is no medicine that will cure cancer. Corrosives are worse than useless, because they frequently stimulate the neoplasm to grow more rapidly and give the victim a false sense of security while robbing him of his chance for cure.

All syphilitic lesions, leukoplakias, ulcers, fissures, indurated scars and other conditions about the mouth that do not heal readily, may become cancers if not treated and cured. Every source of irritation; such as improperly fitting plates, crowns, bridges, fillings, incrustations and roughened or jagged teeth, should be promptly removed. All sources of chronic infection, such as abscessed or pyorrheal teeth, osteomyelitis, glossitis, gingivitis and tonsillitis should be thoroughly eradicated. People should be taught the importance of going to a competent dentist regularly for a thorough and painstaking examination; not because they are ill, but in order to be able to remain well.

## Discussion

*E. C. Hume, Louisville, Ky.:* If we, as dentists, are to take our rightful place, as guardians of the public health, we must see more than teeth when we examine a human mouth. We must be able to recognize the injurious effects that abnormal teeth, artificial or real, produce.

I should like to quote from a paper of Dr. Crile of Cleveland, who has this to say in regard to cancers of the mouth: "To my knowledge, no cancer of the cheek, of the mucous membrane, or of the buccal cavity has ever grown upon normal, unmutilated, uninjured surface. I have never seen a cancer of the mouth in a perfectly sanitary mouth with normal teeth."

We must insist on all of our patients who have suspicious lesions about the mouth returning to us at stated intervals for observation or, preferably, refer them to one competent to diagnose such lesions, and this we must do promptly. Delay in many of these instances means that the cancerous condition has progressed or will progress to such an extent that the condition will become hopeless. This rule we should apply to all lesions that do not promptly heal under ordinary treatment.

In 1919, we had reported 68,551 deaths from cancer. At present, there are about 90,000 deaths reported from cancer in the United States and its provinces each year; 3,400, or 3.7 per cent, of these are located in or about the mouth. Cancer is increasing, we are told, 2.5 per cent each year.

Cancer does not confine itself to people who are past 30 years of age as most of us were led to believe some years ago when in college. In fact, 5.8 per cent of all deaths are due to cancer, and I have had cases of malignancies in children 2½ or 3 years old.

Some of the cancers about the mouth grow very slowly and are often overlooked by both dentist and physician until the patient complains of pain; when the cancer has progressed to such an extent, in most cases, that there is very little hope of a permanent cure. All cancers are at first local diseases and are permanently curable. All forms of irritation should be avoided in our restorative work, especially saddles and denture work, and all irritating sharp edges of teeth, partially impacted teeth and teeth erupted out of the normal line of arch that are a source of con-

stant irritation should be corrected or removed.

In this connection, I should like to quote Dr. Charles Mayo, "Care of the teeth and for the health of children will do more than anything else to produce a sound civilization." Dr. Judd says: "Dentists can do a great deal to prevent cancer of the tongue, and all broken and roughened tooth surfaces in constant contact with the border of the tongue and cheek should be removed." To quote Dr. Ochsner of Chicago: "Decayed roots and roughened edges of teeth must be removed. Cleanliness in the care of the mouth must be insisted upon." The occurrence of cancer in the jaw is usually preceded by some form of irritation or trauma, or the presence of decayed roots of teeth or badly fitting plates or bridges. Inflammation due to filth or infection connected with carious roots of teeth also seems to precede cancer infection.

Dr. George Mueller of Philadelphia, in discussing cancer of the mouth, says, "The outstanding feature in the histories of these cases was the relation of chronic irritation to the disease as a predisposing cause. Bad teeth, either poorly cared for or decayed teeth, were almost universal." Dr. Bloodgood says, "All forms of epulis are potentially malignant." Dr. Canning C. Simmons of Boston says, "The mouth should be kept free from all irritation and the teeth should be cared for if we hope to prevent the development of cancers in the mouth."

Dr. Joseph A. Pettit of Portland, Oregon, says, "In considering cancer of the oral cavity we find presented an opportunity for the observation of lesions in the early stages of malignancies and during the so-called premalignant stage, which is not given, when they occur in other parts of the body. The history of the lesion is subject to the observation and notice of the patient long before it is brought to the attention of the surgeon, and the patient can give the history of his case more clearly than usual. Exciting causes of the initial lesion are usually apparent. Few cases of cancer of the oral cavity appear without history of some preexisting oral lesion or either an inflammatory or traumatic type."

Dr. George W. Crile of Cleveland, says, "The cancer problem is not a hopeless one, no matter how long the discovery of the direct cause of cancer may be delayed. The fact that cancer is curable in its first stages and that every cancer develops from a well-defined precancerous condition will go far toward solving this problem. As for the prevention and cure of cancer of the cheek, tongue, mouth and jaws, in particular, the dentist has a vitally important rôle to play."

I agree with Dr. Aud that quacks with their false advertising cures must be driven out of the country. They lie to the public and never cure cancerous conditions. What they do is to stimulate innocent growths to become cancers in some instances and when the patient is without money and beyond hope of cure, they apply to us, crying for help.

Early diagnosis and complete surgical removal is the only known cure. Radium should not be used in contact with bone if it is possible to avoid it. Palliative treatment is worse than useless and is to be condemned in the strongest possible terms. It gives the patient a false hope of cure while the cancerous condition is steadily progressing to such an extent that no cure can be affected regardless of what treatment is instituted.

One should have a laboratory make a microscopic examination of tissue so that it will be possible to tell definitely what the condition is while there is yet time to effect a permanent cure.

Both dentists and physicians feel a hesitancy in mentioning to their patients the fact that a certain lesion may be cancerous. They seem to avoid, as far as possible, the use of the word cancer, and this, I think, is a serious mistake. If patients are properly informed of the condition, they will seek help earlier, and a permanent cure will often result.

All forms of acid and arsenic pastes in treating these growth about the mouth should be avoided as they never do good and often hasten the development of these growths to a cancerous condition in which cure is difficult and sometimes impossible.

Cancer of the mouth or rather the prevention of cancers of the mouth is our problem, and we must ever be ready and on the alert for these lesions if we are to do our part as guardians of the public health.

# VINCENT'S INFECTION

By M. RATTNER, D.D.S., Detroit, Michigan

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

THE dental as well as the medical literature of the past five years has been more or less filled with articles on "Vincent's angina." From this mass of material, one is impressed with the diversity of opinions expressed by the different authors.

## NOMENCLATURE

The disease caused *by Bacillus fusiformis* of Vincent and its accompanying spirillum is called by various names. Stillman and McCall[1] named it "phagedenic gingivitis"; Hinman applied the term "Vincent's angina"; Grieves used the term "ulceromembranous gingivitis"; while others have called it "acute ulcerous gingivitis"; "ulcerative gingivostomatitis"; "trench mouth" and "Vincent's infection of the gingivae." The Committee on Nomenclature of the National Dental Association recommended that the term "Vincent's infection" be used to denote these conditions. The name "Vincent" is given the infection because Vincent was among the first to describe the lesion on the fauces of the tonsil, while at Val de Grace Hospital in Paris, though Plaut had discovered it some time previously; and even today, it is referred to as Plaut-Vincent infection in Germany.

## ETIOLOGY

The various authors agree that they have found the fusiform bacillus and spirochete in smears and cultures; that these organisms are in symbiotic relationship to one another (although, Tunnicliff believes that the two are really various stages of the same organism); that they may be cultivated under anaerobic conditions; that they are nonmotile and gram negative, and that they may occur in both the pure and the mixed forms, usually in company with the streptococcus type of infection.

One of the most important etiologic factors is low resistance. Vincent's infection is often found in individuals whose general resistance has been lowered by operation, disease or exposure to cold, or in those who are existing on improper and insufficient foods. The organisms also find lodgment more quickly in tissue that has been injured or weakened by: a preexisting pyorrhea pocket, traumatic occlusion of the upper and lower molars on buccal surfaces and inveterate smoking, injuring the tissues of the upper anterior incisors; and in areas that are not easily accessible to the toothbrush; for example, the flap behind the third molar.

One may easily sum up the foregoing by saying that the infection will first attack any area that is weakened by mechanical, chemical or bacterial trauma.

It is commonly thought of as a disease of youth (ages 16 to 35); both contagious and infectious, and occurring more frequently in the male than in the female.

The usual modes of transmission

1. Stillman and McCall: Clin. Periodontia, 1922, p. 167.

would be: kissing, the exchange of lighted cigarettes and pipes, use of unclean kitchen utensils, coughing and the lack of cleanliness of the dentist. In fact, anything that will transmit saliva will carry Vincent's infection.

### Diagnosis

(*a*) *Clinical Symptoms.*—The most characteristic symptoms are as follows: local pain, sore spots, fetid breath, ulceration and sloughing of the marginal tissue, and ready hemorrhage; general: nausea, metallic taste, increased salivation, exhausted feeling, swelling of the lymphatic glands, rise in temperature and metal depression, and sudden attack in acute cases.

*(b) Bacteriologic Findings of the Vincent Organisms.*—Differential diagnosis: The pain or sore spots usually differentiate this disease from other periodontal lesions.

The fetid breath is very characteristic of Vincent's organisms and usually signifies their presence. Davis and Pilot have found that putrid and gangrenous lesions are formed whenever *Bacillus fusiformis* and spirochetes are injected either intrapleurally or subcutaneously into a rabbit.

The reason for the ready hemorrhage is probably the burrowing of the spirochete in the blood vessel, which has no chance for the process of repair to take place.

The slough has a yellowish white appearance and may be wiped off with cotton saturated with hydrogen peroxid. Underneath the slough will be found a highly inflamed area, sensitive and painful, which will bleed at the slightest touch.

The neurosis that is present in nearly every acute case is due to the suddenness of the attack and to *fetor ex,* which is very annoying.

In the chronic cases, one finds the greatest difficulty in diagnosis. The patient here gives a history of a previous attack or of having something the matter with his mouth when he was in the army, which was cured, and was entirely different.

Here one finds little fetid breath, little slough (scarcely discernible), hemorrhage on suction, deep pockets usually about the molars and the upper incisors and no general physical or psychic disturbances. Proof of the infection lies in the verification by the microscope. Too many dentists as well as medical men confuse this condition with pyorrhea.

The following is the differential diagnosis of all the diseases that may be mistaken for Vincent's infection.

1. Pyorrhea alveolaris: This is a disease of middle age, i. e., from 35 upward, found in both sexes and almost universal. The onset is very long and the disease of long duration. It is seldom painful and seldom hemorrhagic. There is no slough and mastication is possible. The patient seldom has psychic disturbances.

2. Mercurial stomatitis: There is a very marked increase in saliva, with painful swelling of the lips, gums, tongue and cheek. The ulceration is grayish blue and evenly distributed. The teeth are loose. There is a history of ingestion of mercury.

3. Syphilis: In the secondary stages of syphilis, pharyngitis, laryngitis and gingivitis with bleeding may be present. The mucous patches are more or less sharply demarcated, grayish white, noninflammatory and not painful. A definite history usually confirms the diagnosis.

4. Pemphigus; erythema bullae; dermatitis herpetiformis: The mucous membrane bleeds at the slightest touch. The crusts and resultant inflammation make it impossible for food to be taken into the oral cavity. The diagnosis is, as a rule, easy, as the skin is affected at the same time.

5. Ulcerative stomatitis;—Vincent's angina: This condition presents the same clinical symptoms as Vincent's infection. The terms as used are mainly applied to the same disease when found in children. The etiologic factors here are certain metallic poisons, such as mercury, lead and phosphorus. The disease also occurs in children that have scurvy, and generally when the general resistance has been lowered by disturbances in nutrition.

6. Cancrum oris; noma: This disease goes just a step further than the foregoing. The diagnosis is obvious as there is a great deal of sloughing and gangrene, and even perforation of the oral tissues.

7. Aphthous, vesicular or follicular stomatitis: First, there is an appearance of small yellowish white isolated spots, and subsequently the formation of superficial ulcers. It is a limited disease, lasting about two weeks. It is usually associated with some disturbance of nutrition. The pain is frequently very intense, and there is difficulty in having the child eat anything. But there is no foul odor.

8. Diphtheria: The appearance of the membrane is frequently yellowish white or gray, but it may be pearly white, green or sometimes black. Although the membrane is frequently seen on the tonsils, soft palate, uvula, pharynx, nose, larynx, trachea and bronchi, it is very seldom ever seen in the mouth. The finding of the Klebs-Loeffler bacillus stamps the disease as diphtheria.

9. Tuberculosis: The ulcerations here are characterized by ragged edges with a dirty gray pultaceous base studded with small tubercles.

10. Staphylococcus infections: The staphylococcus will cause small ulcers to appear on the gum margin, oval in appearance and very painful. They occur in groups of individual lesions.

11. Trauma: Under this head, we will find lesions similar to Vincent's infection caused by food impactions, artificial dentures and the careless use of the toothbrush. No other local or general symptoms are present.

### Treatment

There are so many treatments that have been urged for the cure of Vincent's Infection that a volume could be written on that phase of the subject alone. Among the best that have been offered there are but two that have been really efficacious:

1. Removal of all necrotic material, swabbing with cotton saturated with 10 per cent solution of neo-arsphenamin in glycerin. A mouth wash of sodium perborate, one teaspoonful to one-half glass of warm water, every hour, is prescribed.

2. Removal of all necrotic material, swabbing with either chromic acid (7 to 10 per cent) or saturated copper sulphate solution. A mouth wash of either potassium permanganate or sodium perborate is given.

Scaling and thorough removal of all the calculus is accomplished after the infection has subsided. Smoking is forbidden. A cathartic and light diet are advised for a few days. This treatment has given us, by far, the best result of all the sure cure drugs or dyes that have been advocated from time to time by the members of the different professions.

A few general principles should be kept in mind at all times: (1) absolute cleanliness; (2) removal of all irritants; (3) removal of all slough; (4) no operation of any kind, such as extraction or curetment.

### Observations

From my observation of seventy-six cases, I have come to the conclusion that Vincent's infection is not highly contagious. There have been any number of cases in which the individual has had the infection for some time without realizing

it, and the people with whom the patient associated did not become infected, notwithstanding the fact that kissing and use of the same kitchen utensils( the best means of conveyance) were indulged in.

Furthermore, most of the individuals could not account for the infection except in the lowered resistance of the part infected. Does it not seem that Vincent's infection is in reality due to the Vincent's organism that is found in normal mouths? During the War, smears were made from saliva of 500 men while in Italy, and in all were found *Bacillus fusiformis* and the spirochete. Many observers in civilian life claim to have found the same organism in normal mouths. There must be some activating agent, then, at one period or another, that causes a proliferation of the organisms, and coupled with the lowered resistance permits the condition known as Vincent's infection to develop.

Several authors have correlated Vincent's infection with venereal infection. Out of seventy-six cases, we have but one record of venereal infection at the same time, of a gonococcus variety.

The patient generally gets well within a few days, but is kept under observation for three weeks. From then on, he reports every month, so that if there is any sign of recurrence it may be easily checked. The most important question in prognosis is the general physical condition. If that is good, the patient usually has a speedy recovery, and no trouble is encountered.

## Summary

Vincent's infection is a disease of the oral tissues, caused by *Bacillus fusiformis* and its accompanying spirochete.

It is easily differentiated from pyorrhea and other forms of gingival disease by its peculiar odor, necrotic mass, pain, hemorrhage and its accompanying physical and psychic disturbances and conclusively by microscopic smear.

It is usually found among males. The female is careful about the oral cavity and takes better care of the oral tissues. It is most common about the ages of from 16 to 35. However, it does occur in the female, and there are five patients above the age of 35, one, a man, aged 76.

The most important things to keep in mind are:

1. Removal of all irritations.
   (a) Trauma, mechanical, chemical or bacterial.
   (b) Irritants to the marginal gingiva.
2. No operation of any kind, in order to avoid spreading the infection.
3. Removal of necrotic tissue.
4. Removal of all harboring elements.
5. Absolute dental asepsis.

It has no relation to syphilis. The general resistance of the individual is the most important consideration in the prognosis; and that system of treatment is best which gives the best results.[2]

2. In addition to the reference given, the following will be found of interest:

Davis, D. J., and Pilot, Isidore: J.A.M.A., 79:944 (Sept. 16) 1922.

Hirshfeld, I.: New York M. J., 118:150-154 (Aug. 1) 1923.

French, Herbert: Differential Diagnosis, 1918, p. 72.

Holt, L. E., and Howland, John: Diseases of Infancy and Childhood.

# THE DIAGNOSTIC VALUE OF MOUTH CONDITIONS IN CHILDHOOD

By HARROLD A. BACHMANN, M.D., Chicago, Illinois

(Read before the Englewood Branch of the Chicago Dental Society, December 11, 1923)

MEDICINE makes such rapid strides that, in our endeavor to fulfil the demands of our chosen specialty, we neglect to recognize the connecting links that exist between them all. We fail to sense the responsibility we owe to our patients of a fuller and more general knowledge of the other specialized fields; and, consequently, allow those opportunities to pass which make for the progress of humanity, fostering, instead, the progress of ourselves and our specialty.

I wish to emphasize some of those things you see during the course of your work, which, though bearing no direct influence on your work, may, if disregarded or improperly handled, impair the future of some child.

My first point of emphasis is to be placed on the acute cold. Perhaps no one appreciates the superior importance of this generally considered benign infection more than does the pediatrician. The public, and all too frequently the medical profession, fails to recognize the potential danger of these so-called upper respiratory infections; and yet, there are few of the serious conditions in childhood not ushered in by early premonitory symptoms attributed to the innocent cold.

Of the more important conditions preceded by the acute cold I might mention in passing the pneumonias; gastro-intestinal disturbances; rheumatism and chorea, both precursors to heart disease, and several other outstanding diseases of children. But of special interest to the dentist is the fact that most of the contagious diseases are ushered in by upper respiratory symptoms, and consequently, must be considered in his work with children. Measles, whooping cough and scarlet fever belong especially to this group, showing in their early stages mild-appearing colds; and it is of special importance to remember that they are all highly contagious during this coryzal stage.

In measles, before the advent of the definite skin condition, there is usually quite evident a varying degree of conjunctivitis. It is well to bear in mind, however, that every inflammatory eye condition does not speak for measles, because in many of the epidemics of colds we see this as a complication. The outstanding sign is the presence of Koplik's spots on the mucous membrane on the sides of the mouth, and over the soft palate. These, in a good light, preferably daylight, present small bluish white specks on a red background. With the appearance of the rash, they begin to fade.

The prodromal symptoms of scarlet fever are usually more severe and abrupt, with a markedly reddened throat, which may be quite painful. The tongue becomes hyperemic, with prominent papillae. There is, however, no definite outstanding sign which assures you of the

diagnosis before the body rash is evident, and even then it is not always an easy diagnosis to make.

Speaking in general of these early prodromal symptoms, it is well to remember that all contagious diseases present mild forms and the degree of symptoms is no criterion, so that acute upper respiratory findings should always be held as suspicious until proved otherwise.

Consequently, I urge you to be on your guard when children with colds are treated by you in your office; not so much in protection for yourselves as for the other little patients with whom they come in contact.

The breath with which you become so well acquainted carries with it some diagnostic import. I do not believe that in childhood the foul breath can be wholly attributed to gastro-intestinal conditions. This may occur at times, but is usually associated with some chronic mouth or nasal infection. After you have satisfied yourself that your work has eliminated all possibility of its being from dental caries, the presence of a chronically infected tonsil or adenoid, ozena or some other catarrhal condition of the nose should be considered.

There is one other infection with which a foul odor is associated, and this is diphtheria. The nasal type may produce no systemic symptoms, and present only a coryza, sometimes slightly bloody. Here the membrane is not grossly visible, but exudes a characteristic and offensive odor. Careful examination and bacteriologic studies are frequently the only basis for a definite diagnosis; yet the condition is as contagious as any other type of the disease.

About the lips, there is at least one sign of diagnostic value in the form of fissures or rhagades due to congenital syphilis. At the age you see the child, the fissures will be definitely radiating from the corners of the mouth, varying in size and depth and not infrequently showing definite scar formation. In themselves, they are of sufficient importance diagnostically to warrant further investigation. Usually associated with them are other signs to corroborate the diagnosis.

Herpes of the lips and similar infectious areas about the external nares, though repulsive in appearance, indicate no special blood disease. Generally, they are due to a mild superficial infection which is transferred from one place to another by the patient's own hand and fingernails. The condition is infectious, and similar lesions are usually found on other portions of the body. Not infrequently, other members of the family are affected. This is especially true in the dispensary type of patient, or among inmates of an institution. We term this condition an impetigo and obtain quick relief with mild antiseptic ointments containing ammoniated mercury.

The appearance of the mucous membrane of the mouth and gums is, in childhood, a fairly good index of the general condition. Cyanosis due to cardiac disease and especially that of a congenital nature is easily recognized. Anemia also is very apparent on examination of the mucous membrane. Clinically, I believe, the evidence of anemic conditions is more readily observed here than on the cheeks, which, though pale, may indicate no definite blood disturbance.

The tongue as an indicator of disease has lost prestige. The fact that it is coated, furred or dull and no longer glistens has little diagnostic value, for this condition is present in most indispositions of childhood. Generally, it speaks for a systemic condition impairing digestion or it may be due to oral uncleanliness.

No doubt during your examination of the mouth you have been asked or will be asked "Is my child tongue-tied?" This is a common question, especially when the child has talked late or articu-

lates poorly. Hutchison[1] states that "tongue-tie is a myth of hoary antiquity," and with him I thoroughly agree. I have yet to see a frenum short enough to indicate incision even at the nursing age, when it would be far more definitely indicated than for improvement of speech.

One word regarding ulceration of the frenum, which one occasionally sees: When there is a single ulcer that is associated with a persistent cough, whooping cough must be considered. Though this is not pathogonomic of the condition, it is sufficiently frequent that we never fail to look for it.

The size of the tongue may be significant of one of two conditions, one of which can be greatly benefited by treatment. I refer to cretinism or thyroid deficiency. In this type of child, two of the striking features are the rather thick lips and a broad, thick protruding tongue. The eruption of the first teeth is often, though not always, delayed, and these teeth remain in much longer than usual; whereas, the second teeth are likewise delayed.

The other condition in which the tongue is prominent is seen in the Mongolian idiot. On examination, the tongue is found to be of normal size, though it generally shows marked fissures. The protrusion here is not due to any abnormal size, but rather to the shallow mouth, which in turn is due to the shortened anteroposterior diameter of the head, characteristic of these children.

The ulcerative conditions in the mouth, except for specific types, which are infrequent in children, usually indicate a lowered vitality or oral uncleanliness. Frequently, they are associated with the acute cold, though the child with a good resistance seldom presents a serious condition.

1. Hutchinson, R.; Garrod, A.; Batten, F., and Thursfeld, H.: in Diseases of Children, London, Edward Arnold, 1913, p. 142.

Recently, Gerstenberger[2] has laid emphasis on the fact that herpetic stomatitis is probably due to a disturbance in metabolism. The lesions are usually small shallow circular ulcers occurring in successive crops, seen most frequently at the border of the tongue and inside the lips. Rather striking results were obtained by Gerstenberger on treating these cases with such vitamin-containing articles as orange juice and yeast vitamin tablets.

The true ulcerative stomatitis is a more virulent condition, and more widely spread, involving generally the entire mouth and especially the gum margin. The exciting cause, according to Morgan,[3] is an infection of the gums by Vincent's organisms. Treatment with arsenical compounds seems to be the most efficacious, and in my own experience has proved most satisfactory.

Other definite mouth conditions are thrush and scurvy. The former seldom occurs in older children, such as you have as patients. It is a condition due to a vegetable parasite, which forms a whitish exudate on the mucous membranes. Microscopic smears will show the definite structure of the fungus.

Scurvy also is seen most frequently in the younger child though it is not unusual during the period the first teeth are erupting. The gums are deep purple and swollen, particularly about the upper central incisors. They bleed easily and are very painful. Besides, there are generally such systemic disturbances as fretfulness, sleeplessness and occasionally a cachexia. Investigation of the diet and especially the therapeutic test with orange juice will clarify the diagnosis.

In regard to diagnostic points associ-

2. Gerstenberger, H. J.: Etiology and Treatment of Herpetic Stomatitis and Herpes Labialis, Am. J. Dis. Child. 26:309 (Oct.) 1923.

3. Morgan, E. A.: Ulcerative Stomatitis and Its Treatment by Intravenous Injection of Arsenic, Am. J. Dis. Child. 25: 354 (May) 1923.

ated with the teeth themselves I have little to add to your own knowledge of the subject. No doubt, you are occasionally confronted with the statement and evidence that the child grinds his teeth. This is not due to worms, as the mother no doubt believes, but is associated usually with nervousness and excitability. A thorough investigation of the conduct of the child's life and habits is indicated. A foul breath may at times be accounted for by intestinal parasites, in which case a disturbance of the gastro-intestinal tract may be present; but teeth grinding is not a symptom of this condition as is so generally supposed.

There is one point regarding the differentiation between the notching so frequently seen in rachitic teeth and that characteristic of Hutchinson's teeth. Carless[4] states that in rachitic teeth, the notch consists of the small arc of a large circle, while in syphilis it is the large arc of a small circle. In general, this is a rather helpful hint in differentiation.

I have tried to find some of the more recent views pertaining to the dentition in several of the definite endocrine disturbances, but find rather few references to the subject. Engleback[5] refers to teeth of the preadolescent type of anterior lobe hypopituitarism and says that the palate is high arched and the teeth are straight and regular, with perfect occlusion. There is no early decay, but rather sturdy, healthy teeth are the rule. The latter seem also to be a prominent feature in cases of posterior lobe insufficiency.

In the pituitary-obesity cases of Fröhlich's type, the teeth are very soft. The upper central incisors are indented with fairly wide separation, and with small lateral incisors and cuspids. The lower incisors show marked serration and transverse ridging. All of these conditions, however, must be considered in conjunction with other findings.

## Conclusion

I wish to emphasize one point which, in spite of our efforts, seems still to be misunderstood, especially by the laity: difficult dentition does not produce the multiplicity of symptoms heretofore attributed to it. In the healthy, normal child, it seldom causes more than occasional fretfulness and at times sudden outcries as though of pain. The physician, as Holt[6] states, who starts out with the idea that in infancy dentition may produce all symptoms usually gets no further than this in his etiologic investigations. In the delicate, highly nervous child, dentition may produce symptoms of varying degree, but in the majority of healthy children it causes little or no disturbance.

4. Carless, Albert: Manual of Surgery, New York, William Wood and Company, 1919, p. 665.

5. Engleback, William, and Tice, Frederick: Practice of Medicine, Hagerstown, Md., W. F. Prior Company, Inc., 1921, Vol. 3, p. 337.

6. Holt, L. E.; and Howland, John: The Disease of Infants and Children, New York, D. Appleton and Company, 1922, p. 273.

# SCOPE AND PHASES OF PREVENTIVE DENTISTRY IN THE FORSYTH DENTAL INFIRMARY FOR CHILDREN

By HAROLD DeWITT CROSS,* D.M.D., Boston, Massachusetts

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

PREVENTIVE dentistry is a policy or a procedure the exact nature of which has not as yet been fully agreed on by the dental profession. There was much difference of opinion voiced when this subject was discussed at the last meeting of the Teacher's Institute, some contending that any operation which tended to prevent some future or secondary trouble or disease was preventive dentistry, including in a list of this class of operations properly contoured fillings and inlays; sanitary and scientifically constructed crowns and bridges; more scientific and permanent treatment and filling for root canals, etc. On the other hand, some believed that preventive dentistry meant to prevent the need for technical dentistry; to prevent the initial occurrence of the condition that dentists have been so long striving to repair and cure.

Varying degrees of prevention are recognized; a small filling may prevent a large cavity and the loss of the tooth, but it did not prevent the formation of the initial cavity.

The condition which a tooth is in when it erupts is largely the determining factor as to whether or not it will be subject to caries, and this condition at eruption is again dependent on the developmental factors during the prenatal period and the subsequent time of the formation of the tooth up to its eruption.

The strict interpretation of this definition of preventive dentistry appears to rule out dentists, as at present educated, from the field of preventive dentistry, as the entire process of the development of the teeth is completed before the dentist has any opportunity to do anything that might have some preventive effect. There are two exceptions to this, one of which is the technical work done on the teeth of an expectant mother, in order not only to maintain her own oral cavity at its best for the needs of herself, and to supply the requirements of the fetus, but also, and perhaps still more important, to avoid any possibility of toxemia which might cause injury to the development of the fetus. The other is *early* work done for children, anticipating as far as possible the formation of cavities by cauterizing or filling formative defects in the enamel, especially of the temporary teeth and the first permanent molars.

Preventive dentistry was one of the original policies determined on by the trustees of the Forsyth Dental Infirmary some time before the actual operation of the clinic, and, although stated very definitely, it was adopted perhaps without a complete realization of the full extent or meaning of the word "preventive" as used at the present time.

It was, however, stated in a preliminary announcement that "In formulating a working policy for the conduct of the clinics, the trustees decided at the outset that, to accomplish the greatest good, the new institution must aim at something higher than the mere repair and extraction of carious teeth, or the correction of

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oral deformities, recognizing that the prevention of dental disease was equally if not more important than its treatment."

Following this definite lead, preventive dentistry has been very literally and practically defined so far as its operation in the Forsyth clinics is concerned. Here, it means, as far as possible, to prevent the original occurrence of the defect. While it has not been possible to reach the stage where this condition is actually being accomplished to any great extent, much progress has been made toward the goal, which was established at the time the first attempt was made to reduce the age of the children for initial treatment.

This age reduction, carried to its end, is probably the key to the whole situation, as far as preventive dentistry is concerned. And, taken together with the elimination of a great many dental operations as known today, will ultimately make preventive dentistry more than a phrase to be interpreted according to the light, the belief or the practice of the individual.

The research work carried on by Dr. Howe has had much to do with definitely establishing this preventive policy, which originally was only a theory, but a theory which in turn was responsible for establishing the research department of the Forsyth Infirmary.

When the Forsyth clinics were first opened, children went there for treatment just as they went to many other clinics, at the age thought necessary by teachers, nurses and parents, and, in many instances, by dentists. During the first six months, this age averaged 14½ years, and nearly every child presented himself with the first permanent molars so seriously involved as to require extraction, or in some instances having had them already removed.

It was soon recognized that most of the serious complications had already occurred in the teeth of children of this age, and that while much individual good could be accomplished for them, the work was not really preventive or even progressive, and that preventive work could never be done at such a late age; also, that the more that was done for them, the less could be done of a more definitely preventive nature for others who were of an age, and in a condition, to have work of this type done to advantage.

Therefore, the first actually preventive work to be undertaken was the reduction of the age for initial treatment, and this plan has been constantly adhered to since it was first put into operation.

This reduction of age as determined upon was not intended to be final when an age of 10 or 8 years was reached, but was to continue down to 6, 4 and 2 years, and ultimately to the prenatal stage, which is the goal that was then determined on. However, it was too great a jump all at once from 14½ years to a minus birth age; consequently, the change had to be accomplished gradually and required much educational work with parents, teachers, nurses, dentists and physicians.

The recognition of this simple truth was the beginning of the establishment of a definite policy of preventive work, with the continued reduction of the initial age of treatment as the principal mode of procedure. It was planned not only to continue this reduction to the first permanent molars, or even to the temporary teeth, but to push along on this definite line of action until mothers should bring their babies to the clinic and expectant mothers should come to the infimary to learn the proper course to pursue in order to give to their children teeth as good as Nature originally intended them to have.

The prenatal stage, then, is the ultimate goal which it is necessary to reach before really preventive work can be done to any actual advantage.

During this time, it has been found desirable to eliminate, as far as possible, the more technical dental procedures, such as root-canal treatments, and to re-

sort to a fairly radical policy for the extraction of many teeth, which it has been heretofore customary to fill or treat.

Another reason why it has not been possible to reach this ultimate condition quickly is on account of the great need for reparative, palliative, and emergency work, and because time is required for people (including dentists) to become educated to this scheme of prevention or early attention; consequently, it has been found desirable to establish intermediate goals to which attention could be directed for the time being without hindering the progress toward the actual or ultimate goal.

The first of these intermediate goals was the care of the first permanent molar. Work on this tooth was not undertaken by the more usual plan of root-canal treatments, or by any other complicated technical procedures, but by the simple plan of attending to this important tooth before there was occasion for any complicated technic. In other words, a detour was made direct to this tooth very soon after its eruption and at a time when simple treatment was sufficient to prevent serious inroads of decay.

The visits of the children at an age when this could be done was made possible chiefly through the cooperation of the school nurses, who arranged that they should go to the clinic at the proper time, which is usually sometime during the first school year.

While not every child in Boston has intact first permanent molars, from 95 to 98 per cent of those up to and including the seventh grades in those districts where children have taken full advantage of the opportunity have four of the first permanent molars in good condition with only small fillings at the most. While many others are in this same condition, it is not so general, as this result can be accomplished only by giving early treatment, before serious inroads of caries has occurred; and, as children in older grades were not treated so definitely at the early required age, many were obliged to have the first permanent molars removed on account of extensive decay.

This result referred to involves a school population of approximately 65,000 children, and it can be conservatively stated that these results could not have been accomplished, if at all, had the customary root-canal work been done, by less than fifty times the number of dentists instrumental in getting the results referred to.

This group of children does not represent anywhere near all who have benefited by the Forsyth clinics, as large numbers of parochial school children have been treated, as well as a great many from the nearby towns and cities.

The second intermediate goal is the care of the temporary teeth, which should be attended to between the ages of 1½ and 3 years. Children of this age are now coming to the Forsyth Dental Infirmary in large numbers through such agencies as the baby hygiene association and similar organizations. Initial attention at this age will ultimately supersede that of the six-year period as soon as sufficient numbers of children can be reached. Although the first molar on eruption will still require the same local attention until conditions during the development of this tooth are what they should be, it will erupt into a mouth more suitable for its reception. Work at this age, a preschool feature, will result practically in putting all children into school with sound and clean teeth, and will reduce to a minimum the attention to their teeth during the entire school period.

The third goal will concern the baby (6 months of age) period, and as few babies have teeth at this age, it becomes necessary to begin to consider almost exclusively medical (pediatric) or nutritional rather than the usual dental features for a clinic dealing with children of this age.

The present knowledge of the nutri-

tional aspect of the development of the teeth makes medical attention a logical and necessary feature of any preventive dental program; in fact, one may with reason believe that the only really preventive work must be entirely medical in nature rather than the present technical dental procedure.

The fourth goal, or the last step, as we know now, is probably prenatal care, in the period during which it is possible to influence the formation and development of the temporary teeth and lay the foundation for the permanent ones through the diet, hygiene and physical condition of the expectant mother. This may not actually prove to be the ultimate goal, as it may be necessary to consider heredity to a certain extent (Dr. Oliver Wendell Holmes said that a boy's education should begin with his grandparents); so, probably, the foundation of good teeth is begun with the grandmother's own good physical condition. When large numbers of children are born with good prenatal and postnatal attention, technical dentistry, as now practiced, will probably be much less required than at present.

So much for a policy program, which to a certain extent may be called theoretical, but which is actually being reduced to definitely practical work. Medical (nutrition) clinics have been carried on for some time, and while most of the children attending so far have been a little old to be very much benefited, some good results have been accomplished. One difficulty has been to get mothers sufficiently interested to bring children to a dental infirmary and be satisfied to get only medical advice for bettering the tooth conditions of their children. Many are now much interested in this feature, while there still are some who feel that they should leave a dental clinic with something tangible to show for their visit, such as a tooth filled or extracted.

These medical clinics are being carried on with the idea that if people will become enough interested in the subject of nutrition to begin to apply the principle sufficiently early and to continue its application during childhood, the civilized portion of the human race may eventually have as good teeth as those of the savage.

So far as the preventive dental technic is concerned, there has been devised no especially new type or method of operations. The results have been obtained, in the most part, by the use of the usual "orthodox" dental operative technic, the only unique features being that many of the usual technical procedures are not carried out here, while others not usually carried out are featured here, in all instances, the greatest good to the greatest number, or to the group which will show the greatest results in progress, being kept in mind.

Since, to do this, it is necessary that all teeth be dealt with in as nearly final a manner as possible, permanent fillings or extractions of teeth, whether primary or secondary, are made. However, radical this may appear, it is the result of a twofold policy, since all opportunities thus made by shorter, simpler and more lasting operations are placed definitely to the advantage of other groups of children whose teeth are in the initial stages of caries; and the work done for the first group may be said to be "permanent".

Silver nitrate has always been used to a considerable extent on temporary and first permanent molars, both alone or in combination with cement fillings. Since the silver reduction process has been made available by Dr. Howe, its use has been more general, and it has become a routine procedure to reduce silver in all fissures and approximal surfaces showing either initial caries, or in cases in which experience has shown caries will occur.

The Arthur method applied to temporary teeth, followed by silver, has proved of much value in many cases, and with a considerable saving of time over the usual fillings.

The cleaning and polishing of teeth is

classified as an operation with a preventive tendency and of much value, but taken alone it is not considered definitely preventive of caries.

Cleaning children's teeth, however, provides a most excellent way to interest them in the care of their teeth, and, of course, has a definite value in the prevention of diseases of the gingivae, and in controlling many systemic diseases which gain their first foothold on the system in the mouth.

The complete removal of all diseased tooth conditions, extracting teeth which cannot be put into a permanent first-class condition, filling only those which can be filled with good certainty of not causing any trouble for at least six months, is the only "cleaning up" which is really effective in eliminating and preventing caries.

Caries is usually considered a disease of childhood, but it is a question whether is should be actually so considered, as the absence of this condition during adolescence and adult life is frequently very largely a matter of "elimination" during childhood of the teeth with structural or developmental defects, with the result that the absence of caries in the teeth of the adult is really in many instances only the "survival of the fittest," or the normally developed teeth.

In line with the elimination of complicated technical operations, and the substitution of work of a simpler but more preventive nature, is that of discontinuing the usual orthodontic work and substituting for it that which has been designated "dental orthopedics." This deals only with the widening of the maxillary bones for young children, treating them before a real deformity appears, and is in a measure preventive orthodontia, or at least partakes more of the preventive features than does the ordinary orthodontic procedure. This dental orthopedic work is applied to children from 4½ to 5 years of age, and is intended to provide only the development of the maxillae in regard to the width of the arch, which should be normal for this age. This places the arch and teeth in the normal position for the eruption of the second set, providing artificially the growth and space which Nature has failed to provide. This work has not been carried on long enough to permit of any definite conclusions, but so far it appears that it will eliminate nearly all irregularities of the second set of teeth, a possible exception being the irregularity resulting from the thumb-sucking habit. It may be suggested, however, that even this irregularity may be prevented, as the thumb-sucking irregularity may be due as much to the failure of the lateral segments to expand as to the too great expansion of the anterior segment, as is ordinarily supposed. This theory has some support in the fact that large numbers of children having uniformly wide arches have not shown the protrusion of the anterior segment usually found among narrow-arched children.

This condition of uniformly wide arches suggests the fact that even today, although it is perhaps not generally recognized, children are being born, in civilized countries, who are only very slightly susceptible to caries, perhaps averaging from 2 to 5 per cent defects. This knowledge comes from observations which have been made on children from 6 to 15 years of age, and these children have never had the advantages of any artificial preventive work, not even the knowledge of the use of the toothbrush, as most of the teeth would be classified as dirty and lacking care. In spite of these conditions, the temporary teeth and the first and second molars have developed and erupted and have served their purpose for several years with no signs of defects either developmental or secondary.

It may be suggested that conditions like this are the result of a real fundamental, albeit natural, preventive dentistry, there being no indication at all in

these teeth of any technical dental operations, yet the teeth are sound and perfect.

The work of the Forsyth Dental Infirmary Clinic is being developed along lines tending toward the application of principles of a medical (nutritional, hygienic or metabolic) nature, which may be expected to give results similar to those just referred to in this group of children. All dental technic work is being either simplified or eliminated, as rapidly as it is possible to get cooperation with parents, to progress to the next logical step leading to prevention; and always dealing with younger and younger children until a prenatal stage shall be reached. When this shall have been accomplished, it can truthfully be said that real preventive dentistry is being carried out, both theoretically and practically.

## Discussion

*Thomas B. McCrum, Kansas City, Mo.:* The dental profession is fortunate to have such an institution taking the lead and definitely establishing a policy of prevention. The Forsyth Infirmary has been the pioneer in establishing dental service for children in a large way and, with their splendid building and equipment, they are setting the example for other cities to do likewise. It has always seemed to me that we should begin our preventive work with the preschool child and have them begin school with sound teeth and a clean mouth; so the first permanent molars will have a clean environment to begin their growth and during their eruption.

The establishing of the research department was a notable step in the progress of Forsyth Infirmary and their giving to the profession of the nitrate of silver reduction method has revolutionized the treatment of teeth. Dr. Howe's later work in deficiency diet is recognized by the profession as splendid work, and will result in a great amount of good for the coming generation.

I would like to have Dr. Cross describe further the "Arthur" method of treating decidious teeth as referred to in his paper.

I am glad the Forsyth Infirmary is giving considerable attention to dental orthopedics, and hope they will be able to show that it does eliminate the need for orthodontic treatment later on. It has been my experience that when the jaws are too small at 5 years they seldom change, and instead of Nature overcoming it, as most dentists believe, the condition grows progressively worse and the case invariably calls for orthodontic interference later on. We who are doing children's work are eager to learn all the good work coming from the Forsyth Infirmary.

*N. C. Leonard, Baltimore, Md.:* I would like for Dr. Cross to describe again the method used to prevent orthodontic deformities.

*Dr. Cross:* The plan is merely to expand the arch—the maxillary bones, no attention at all being given to tooth irregularities, and it is being accomplished by a buccal arch with lingual arms. We have been using a short vertical tube. This method is the one proposed by Dr. E. A. Bogue of New York, and was adopted after the orthodontic clinic was given up. We have since improved on that appliance slightly by using a square, horizontal tube with a chuck arrangement in the anterior portion of it and a square arch, which prevents the tipping of the teeth just as well as the vertical tube and is very much easier to arrange, because the arch is just a simple one without any loops or other complications. The purpose is merely to widen that arch and we are doing that, measuring the arch of every child. Dr. Bogue's examination of a large number of cases showed that under a certain measurement there was little likelihood of further expansion and that if growth stopped at this age, it was likely to be permanent. In his own observation, it had been permanent in every case with the exception of one. I have several models, slides and diagrams illustrating models which Dr. Bogue had showing the width of the arch at 4½ and 5 years of age, at 12, at 18 and at 24, with absolutely no increase. That is astonishing, until one follows it out.

We believe that this is going to accomplish, not all that orthodontic procedure has accomplished, but it is going to provide very largely for the prevention of the need of orthodontia. Orthodontia has not proved a success in our clinic, not because the cases were poorly cared for or because they were not carefully treated or because they did not give satisfactory results, but because we could handle only about 3 per cent of the cases which needed attention. With this dental orthopedic clinic, we are able to handle all of the cases that need attention. It takes only from two to three months to accomplish this and we are handling all needing attention out of a group of 4,500 children during the school year.

*Dr. McCrum:* You spoke about the Arthur method of treating deciduous teeth.

*Dr. Cross:* It means merely grinding a "v" space between the teeth—and is applicable only to deciduous teeth. After grinding, silver is reduced upon the surfaces.

# THE CARE AND DEVELOPMENT OF CHILDREN'S TEETH

By RICHARD A. SUHR, Cleveland, Ohio

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

IN bringing before you this subject, which will not include cavity preparation, treatments and fillings, but development and care in general, it is my purpose to emphasize the importance and value of restoring the temporary teeth to a healthy condition and retaining them, until the proper time for removal.

It is of great importance that the child and parent be educated to the necessity of periodical examinations of the child's teeth. The dentist should consider it his duty to remind the parents when the stated time expires, after complete restoration has been made, in justice to himself and to the child. If you do not do this, many times the child will not return until considerable trouble has developed: either there are more broken down teeth or the temporary teeth have been retained too long. There is much to be said against retaining temporary teeth too long. There are many times when the child's age is beyond Nature's time for removal. The temporary teeth are still firmly in position; the roentgen-ray show the roots not entirely resorbed, and also show, because of the retention of the temporary teeth over Nature's time, that the incoming permanent tooth takes a slanting or even a horizontal position. It is many times a question, whether, without the assistance of the orthodontist, the permanent tooth would erupt at all. The roentgen-rays often, must be resorted to for aid and decision.

There are cases in which no permanent tooth underlies the temporary, and also cases of a temporary tooth under a temporary tooth, this being a supernumerary tooth.

Many times patients question us regarding the chronology of the eruption of deciduous teeth, and the eruption of the permanent teeth. As a means of education we should have the chronology printed on a card, to give them, as shown in the following tabulation.

Chronology of the Eruption of Temporary and Permanent Teeth

Temporary upper and lower central incisors—6th to 10th month.

Permanent upper and lower central incisors—6th to 8th year.

Temporary upper and lower lateral incisors—8th to 14th month.

Permanent upper and lower lateral incisors—7th to 9th year.

Temporary upper and lower cuspids—14th to 22d month.

Permanent upper and lower cuspids—10th to 12th year.

Temporary upper and lower first molars—12th to 18th month.

Temporary upper and lower second molars—24th to 26th month.

Permanent upper and lower first bicuspids—9th to 11th year.

Permanent upper and lower second bicuspids—10th to 12th year.

Permanent upper and lower first molars—about 6th year.

We all know that children between the ages of 2 and 9 years will have decayed molars, and even babies of 1 year will have anterior teeth decayed, while we

note that the bicuspids do not erupt until from the ninth to the twelfth year. We should not deprive the child of the use of these temporary molars, and it is assuredly wrong to extract them.

Abscesses are so very common in children's teeth, and the teeth are removed many times long before they should be, the dentist making the extraction with the best intentions but wrong judgment. As the parents become educated and the child grows to the age of reason, this practice will be condemned, and justly so.

Fistula abscesses in temporary teeth are the most common; acute blind abscesses are not at all common.

If, on opening into the pulp chamber of these teeth having blind abscesses, when there is swelling in connection, there is an abundant discharge of pus and blood, the operator is encouraged to save the tooth; if not, it would be advisable to extract, to prevent the spreading of infection, as this condition is a factor in, if not the entire cause of the infection of the submaxillary gland.

Quite frequently, we find, on opening into the pulp chamber of a tooth, without swelling, a gush of blood, and again we will find a discharge of blood due to a slight exposure of the pulp, which at first appears to be a slight hemorrhage of a live pulp, and not until another sitting can one determine it to be a putrescent pulp.

A fistula is generally developed with little discomfort to the child.

The explanation for this might be that the density of the alveolar process and the soft tissue, the periodontal membrane, met with little or no resistance in permitting easy drainage. My observation has been that filled roots and the roots of abscessed teeth are less likely to resorb than the roots of healthy teeth, the reason being, I believe, that those teeth are deprived of the nerve supply.

It it also evident, in these cases, that, before and after extraction, the permanent tooth erupts earlier than the roots, which have resorbed in a natural, healthy tooth.

In this condition of incomplete resorption, it is necessary to extract prematurely, the reason being quite evident; namely: that the destruction and resorption under and between the roots of abscessed temporary teeth offer the least resistance to the permanent tooth for eruption.

The importance of taking cultures of children's teeth comes to our notice, especially so when the medical profession refers cases of children with swelling of the lymphatic glands of the submaxillary region as possibly caused by abscessed teeth and insist on extraction.

Cultures taken from temporary molars showed straight *Staphylococcus, albus* and *aureus,* and most cases will show them.

Streptococci are sometimes found in conjunction with the staphylococci, but more generally in adults.

Infected tonsils and adenoids may yield cultures of streptococci, *B. mucosus capsulatus,* pneumococci, the grip bacillus and other pathogenic micro-organisms, staphylococci included, and as a culture medium of pathogenic bacteria are a constant source of danger as a portal of entry to infectious bacteria through the lymph and blood streams to the tissues, primary focal infections of the tonsils and nasopharyngeal tissue, associated with secondary infection of the lymphatic vessels and lymph nodes of the neck.

Pathogenic bacteria are all micro-organisms, and when brought into contact with any part of a living organism, under favorable conditions, they multiply and give rise to either local or general disturbance; while those that are non-pathogenic, when brought into the organism in large numbers, soon disappear without having produced any disturbance. If living pathogenic bacteria are

present, an infection will take place, the intensity of which depends on the number and virulence of the organisms, and thus endangers every wound which is made.

Mastoiditis, an extension of nasopharyngeal infection through the eustachian tube and middle ear, is a serious and frequent disease of the young. Streptococcus and pneumococcus groups are the usual infectious agents.

Many children also have large tonsils and other enlarged lymphoid structures of the pharynx, which make a good soil for bacterial growth.

The faucial tonsils are frequently infected through contaminated air or infected food, especially milk, and by direct contact with infected individuals.

A culture medium for bacteria is therefore important in the care of children's teeth and should be strongly advised, as children are especially susceptible to infection of the tissues of the mouth, throat, nose, accessory sinuses, middle ear and the mastoid cells. Tonsillar tissues are especially a culture medium of pathogenic bacteria.

Let us not as dentists leave it for the medical profession to decide on a hasty supposition or suspicion, and sacrifice these useful teeth until the physician has our point of view and after all decay and suppuration has been removed and evident health seems assured in these particular teeth, foregoing the filling of them until further investigation is made.

In regard to the subject of abscessed teeth and systemic infections, the reference is mainly to children in private practice, as they are regularly and periodically looked after in cooperation with the family physician in such cases. The dentist will at times lay aside his own convictions, acting on the advice of the physician, should he conscientiously believe that the child's resistance does not warrant the retention of the abscessed tooth or teeth. It is quite another matter with the children of the public, who are not so fortunate as to be cared for professionally. They must necessarily be given the first aid, namely, extraction, as the means of assisting them back to health.

The removal of temporary teeth before their time allows the space required by the permanent tooth to close up, and also hastens the eruption of the permanent teeth before the development of the maxillary to receive it. Permit even roots to remain to retain space. The root canals in temporary teeth have large openings, and permit easy access; particularly, allow a root to remain that is next to the first permanent molar to prevent it closing the space and also to prevent slanting of the tooth.

This suggests the importance of retaining the space caused by premature extraction, when fixture must at times be made in order to retain the space and include the straightening and perfect occlusion of the slanting first permanent molar.

Abscesses in temporary teeth should not work such a hardship for us. Two or three, hardly ever four treatments, are necessary to correct abscesses. Root canals have large openings and fistula abscesses respond quickly. The treatment of these abscessed teeth does not require any particular method or medicament other than what every operator has his own way of employing. But I think it is well to consider the child's dislike for the taste and odor of disagreeable medicine, which may cause difficulty in gaining submission; and it is well also to avoid medicaments injurious to underlying teeth. I have found the use of essential oils and hot water of the temperature permitted is all that is necessary.

A filling for root canals should be of a material that permits the natural resorption of the roots. I advise the use of temporary cementum mixed into a paste with oil of peppermint, a piece of vulcanite rubber being used for pressure.

A material like chamois named spunk, which can be bought at the dental supply house, is used in small pieces to absorb the oil, leaving the material dry and chalky. The use of cotton pellets for this purpose would be unsatisfactory.

As to the filling of cavities, I do not believe in cements, as we cannot insert a cement filling unless the cavity is in a dehydrated condition, and we would not use a rubberdam on a baby tooth. If we did, I am sure we would not attempt it a second time. Amalgam or copper amalgam should be inserted, for permanency, and for quick and easy results. Cotton rolls can be used satisfactorily.

With children, we must work rapidly, carefully and patiently, with mutual confidence all the time we are preparing the cavity. Children's teeth are not the sensitive organs that many believe them to be, not at all as compared with their little minds.

The first permanent molar is one that presents many problems. We all know Nature's intended purpose for these molars—appearing as they do at the age of 5 or 6 years, acting as the pillars of the building while the substructure is going on, and not relieved until bicuspids or second molars are in position.

The first molars, no doubt, because of their early eruption lack complete development. It is because of the porous condition of these molars and the force during mastication that solutions of sugar and other carbohydrates may easily enter the interstitial spaces, grooves and fissures, lactic and other acids forming, by the action of the bacteria on the sugar or other carbohydrates.

There are many cases in practice in which a child has been badly neglected, and many parents cannot understand that the first molar is a permanent tooth, presenting the argument that the child has never lost a tooth in that location. More explanatory education on the part of the dentist is necessary. This terrible neglect has sometimes gone so far that the crown of the tooth and pulp are in jeopardy. At this age, devitalization of the pulp and filling of root canals would be folly, when the tooth in question has not fully developed as to roots, root canals or pulp chambers.

This condition, then, gives serious thought as to what is best. If we remove one or two pillars, we would expect a collapse of the entire structure. The opposing tooth or teeth would be helpless and would elongate because of nonresistance; in other words, there would be no occlusion. We all have our own methods of treating exposed pulps by capping to retain life as long as possible, sometimes resulting successfully, at other times a failure. I endeavor to do this as successfully as I can, making restoration to the best of my ability, and at the same time, informing the parents just what has been done and explaining that the operation must be periodically watched. If in any case the pulp dies, it must be opened up before conditions are further advanced—than the development of gases, due to the dead pulp, and the tooth or teeth are to be retained only until the coming of the second molar, and then extracted, to permit the second molar to take the place of the first. In these cases, it is necessary at times to go to the very extreme and remove opposing molars, whether healthy or otherwise; this to be determined after a roentgen-ray examination assuring us that the second molars are on the way.

It may be interesting to dwell a few moments on the conduct of the dentist, patients and parents in the office, in order to meet conditions and successfully perform operations for which we are visited.

As a dentist desiring to encourage the practice on children, which I enthusiastically do, and I heartily wish that more dentists would take kindly to this

limited but much needed practice, I wish that general practitioners would make an effort to help educate the parents, as these little ones are being prepared, and will make more appreciative patients for you when they are grown up.

A child coming to the office must be favorably impressed. You must love children, and children must like you on the first impression. The submission of the child depends on the disposition or attitude of the dentist.

The words pain or hurt must not be mentioned; we must use tact and diplomacy. Explain matters as simply as the child's understanding will permit. Never falsify. Keep promises, or make none. Never begin on a troublesome tooth. Start on a simple cavity, thereby overcoming fear and establishing confidence and working toward the more difficult.

Again, I say, establish confidence, and when mutual confidence is established, you will notice both that of the child and yourself. Then you can make the more difficult fillings as easily as the simple ones. During the sittings, explain to the child and parent all that it is important for them to know, mouth hygiene and proper use of the toothbrush.

What I have just said is applicable to the majority of children that come for treatment. Now and then you will meet with greater difficulties and problems than the above mentioned. In fact, you will meet, as I have, such discouraging cases that you will be tempted to give up this practice, and indeed you may feel hardly fit to do any more for the rest of the day. Happily, these cases are few and far between, and I would not for the world discourage those who have intentions of following a practice limited to children.

Such cases are presented by the spoiled child, with a mixture of temperament and fear, expecting sympathy and protection from the parent, a child that has not been taught obedience, and has been punished by fright, or heard gruesome tales of punishment by the doctor or dentist.

Your greatest difficulty in these cases is the parents. They think it is a punishment to the child to have the teeth filled and treated, and express sympathy by words, looks and actions.

If these difficult parents would rather sympathize and cooperate with the dentist and take the initiative step of firmness with the child, they would note, with surprise and relief, that after the first or second sitting the child would have no fear and bear no dislike but rather in their honest and frank minds will want you to forget just as quickly as you can the disturbance they have created, and from then on step by step, you are in their confidence and they no longer are afraid of you.

What an influence you can have over them. All that you tell them will bear weight. Interest yourself in whatever interests them.

Consider it your further duty to call the parents' attention to any physical defects of the mouth, nose or throat you may notice. Deformities of the mouth arising from mouth breathing or habits formed in infancy from thumb-sucking or of pacifying devices are to be considered; adenoids and the enlarged lymphoid follicles, which cause mouth breathing.

A child's diet is brought to our notice at times, and on questioning, we are informed that the child refuses the necessary food to build up the bone tissue. The dentist can do a great deal through his influence in this direction, to correct the diet.

Artificially fed children have the poorer structure of teeth. The muscular effort of the act of nursing, compared with bottle feeding, leaves no doubt as to stimulus for the mouth structures of the growing child. Properly feeding the

child in the early periods of life is of the utmost importance in its later development along all lines, until natural resistance to infection and to degenerative conditions is built up and conserved. This applies to the proper development of the bony structures, including the teeth, in a most striking degree.

Diseases of nutrition such as rickets and scurvy even of very mild degree have their far-reaching influence.

Mother's milk contains about 2.5 per cent protein, 3.5 per cent fat, 6.5 per cent sugar and 0.25 per cent inorganic salt. Water is about 86 per cent of the infant's diet. Vitamins are also present in uncertain quantity. The child needs more protein food than the adult, because of new tissue producing. The child, also, needs more fuel food. The small body has more surface in proportion to the weight and the amount of food required varies more directly with the surface of the body than with the weight of the body.

The child is at the breast until from 6 to 9 months of age, and when the milk is normal it is, of course, the best food for the nursing child; but when it is wanting in the important elements, it must be discarded for cow's milk, modified to meet the demands of the case. How frequently this proper modification is neglected can only be conjectured, but that this is more commonly the case than otherwise must be noticed.

How much improper feeding with foods lacking the important proteins, fats and mineral elements and lastly the proper proportion of vitamins has to do with improper tooth development one can only theorize.

However, when one sees the prevalence of poorly developed teeth, with all the complicating mouth and gum infections, due largely to modified resistance, one can surmise that we have only begun to realize the importance of proper nourishment for the growing child and infant.

The requisites for proper feeding in case of a deficiency of milk are: (1) good raw materials—the freshest and cleanest milk possible; (2) knowledge on the part of the physician of at least the approximate consumption of milk and cream in the home; (3) directions which are clear, explicit and in writing, that they may be understood; (4) the cooperation of a competent mother or nurse, that they may be carried out.

## Discussion

*M. Evangeline Jordon, Los Angeles, Calif.:* Prevention through treatment of the deciduous teeth is the most important subject in the dental world of today. Dr. Suhr's treatment of this theme shows that he is writing from actual experience and not giving us an essay on "theory." His appeal is opportune. The physician does not shirk the work for children and dentists should not. Dr. Suhr calls our attention to the serious dangers of neglected abscesses of the deciduous teeth, a fact so frequently overlooked by physicians and dentists. These abscesses which quickly follow the first development of caries in the teeth carry bacteria into the circulation which may, and generally do interfere with the growth of the child. This poisoning of the blood stream lowers the resistance to disease and the child suffers from any of the diseases of childhood to which he is exposed.

Dental caries is a preventable disease, but the problem of how to overcome it is overwhelming when we contemplate the fact that from 80 to 90 per cent of all school children suffer from it.

In a few localities, the work of philanthropists or members of our own profession is pushing back this tide of dental caries in childhood, but in most communities no obstacle is opposed to the spread of this disease. Dr. McCollum and other scientists tell us that a radical change in diet is our only hope, and my many years of clinical experience agrees with their laboratory results. The question of food is such a big one that no time in the discussion of a paper can be given it, but all evidence points to the conclusion that tooth development is less perfect when the child is on a deficient diet. Even in a home with an abundant table, many children, particularly those that have been bottle fed, select only sweet, soft starchy foods.

Dr. Suhr's psychology is sound and I wish to commend it, particularly the following points:—The first experiences of a child in

the dental office must be of a nature to leave good impressions. If the idea that nothing will hurt him is fixed in his mind during the first two or three visits, later painful experiences, such as extraction, will not permanently change his first attitude.

The bearing of the dentist is important. He should be patient, understanding, kind, and at all times truthful.

Dr. Suhr speaks of the spoiled child expecting the sympathy and protection of the parent, from the dentist whom he fears; but he does not say how he manages in such cases. In both my Los Angeles and San Francisco offices my associates and I never fail with this type of child if we have the cooperation of the parents. If they refuse this cooperation, we refuse to undertake the work. After explaining our methods, we dismiss the parents from the room. Any child will yield to gentle force when he stops yelling and begins to reason. While he is crying and struggling, the nurse holds him in the chair, controlling his hands and feet. The operator holds his mouth shut with a folded napkin covering it, but not his nose, and tells him he will free him as soon as he is quiet. When the child promises, she releases him at once and gives him a drink. If he begins to cry again she repeats the application of force. A badly spoiled child it may take half an hour of this discipline to conquer, but as the work can be carried along so much more rapidly afterward no time is lost. During this discipline, convey to the child in words and actions that you are his friend and will do nothing to hurt him. This gentle force is our way of applying the "mild parental firmness," of which Dr. Suhr speaks, which if exercised at home, need not be practiced at the dental office. Instead of resenting discipline in the dental chair, children admire, and frequently love, the operator who wins their respect through a firmness which is just and truthful.

In discussing operations, I shall mention two points in which I may differ from Dr. Suhr: first, the success that has followed the use of alum paste as a filling for root canals. The prescription is: equal parts of alum, thymol and glycerin mixed with sufficient calcium phosphate to make a paste. In using this paste, we have nothing to fear when the roots begin to resorb. The alum paste does not injure the osteoclasts, and devitalized teeth, in particular, resorb in an almost normal manner.

The second point is the filling material to be used in deciduous teeth. In the fifteen years I have limited my work to children, and particularly since 1913, when I began employing an associate dentist, careful records have been kept of the filling materials used. Copper amalgam has been found the only practical filling material for use in the deciduous teeth. It is easier to apply and is less irritating to the pulp than other filling materials. The black copper salts inhibit the recurrence of caries at the margins of a cavity filled with copper amalgam.

Silver amalgam carelessly placed causes unnecessary suffering from abscesses when the filling is placed too near the pulp or when cavity preparation has not included the removal of all caries. The operator who seeks some quick method of cavity sterilization instead of removing deep seated caries, and also the pulp, if there is an exposure, better take the afternoon off to play golf, and leave the tooth unfilled, as the resulting abscess is much less painful than if the gases were shut in by a beautiful silver filling. Cements are of doubtful value, as in acid saliva they cannot be expected to last more than a few weeks.

# PREVENTIVE DENTISTRY IN KANSAS

By LESTER D. MITCHELL, D.D.S., Arkansas City, Kansas

(Read before the Chicago Dental Society, Chicago, Illinois, January 17-19, 1924)

KANSAS, in 1919, passed the law which is in force at this time, providing dental inspection for all school children, both city and rural. The fourth inspection under this law is being completed at this time. This law is a sequence to the law of 1915, providing for a dental inspection and free dental service to indigent children in the cities of the first class. The foundation for dental legislation in Kansas was laid by dental talks by members of the profession before parent-teacher associations, women clubs, chautauquas and schools; by lectures to the general public on the occasion of sessions of our different dental societies, and by the usual occasional school examinations demonstrating the crying need of dental activities, and finally emphasizing that preventive measures rather than reparative were the only salvation. Prior to the passage of the law of 1915, Wichita through educational activities in general, and before the parent-teacher association in particular, and with the help of the parent-teacher association, provided a dental clinic for the purpose of examining all school children in the city besides caring for indigent children in a more extensive way in the matter of dental service. The time was ripe for a law. Our state society appointed a legislative committee of which Dr. Harry McFarland of Kansas City, Kan., was chairman, and this committee drafted a bill covering cities of 1,000 or more, providing for inspection and service to those unable to pay. A copy was mailed to each member of the state society and the bill was introduced into the legislature, but the committee was compelled to change to cities of the first class, of which there are but three in Kansas. The bill became a law, and the city of Wichita took over the clinic established with the parent-teacher association's assistance, and a clinic was likewise established in Topeka and Kansas City, Kan. The passage of this law seemed to us to be a great victory. Dr. Crunbine, secretary of the state board of health, was much interested. They had tried repeatedly to get some health measures through the legislature, only to experience failure and disappointment. The state board of health proposed that we introduce a bill permitting them to tack on a rider providing physical inspection. Of this, we were just a little afraid and finally decided to go on alone. We made an appropriation to our committee and pledged our undivided support. When the law came out of the legislative halls, it was what it is today, mandatory that all school boards in the state provide inspection for their schools. At this point Dr. Crunbine offered to assume charge of carrying out the letter of the law through his office, which was a great satisfaction to us. A meeting was called of the members of the executive council of our state

society, along with representatives from the state board of health and superintendent of public instruction, to provide for the standardization of provisions for the carrying out the letter of the law. We adopted an examination card on the back of which was a superficial physical examination of even greater length to be carried out by the teachers. We also, adopted recommendations to county superintendents and recommendations to teachers providing that they make the superficial physical report, post results of examination on a condensed sheet and forward them to the county superintendent, who in turn should forward all reports to the state board of health. We adopted rules and regulations for inspectors, relative to sterilization, recommendations as to the charges to be made and instructions relative to a dental hygiene lecture and toothbrush drill for the students, following the inspection. The secretary of the Kansas State Dental Society sent a copy of all recommendations to every dentist in the state. A printing house printed and forwarded to county superintendents their quota of blanks, along with recommendations to superintendents and teachers.

Some counties were divided into districts, and each dentist did his share of the inspection. In our county, we employed a young man who made all the examinations in the county, which I believe to be the better way. After three years, as Dr. Crunbine had no funds available, the state society appropriated sufficient money to compile a report, which was published.[1] Of thirty-five counties making reports, only two made these reports for all three years, and of these, the reports were largely from different schools each year. Only seven counties made reports for two years. One of these was the county in which I live, and we certainly have had quite a thorough inspection up to this time each year; which would indicate a much more thorough enforcement of the letter of the law than indicated by the report. It is true that our law is not universally enforced, but few laws are. The provisions for this inspection and for remuneration for the work were made by the inspector with school boards individually, and now while our law is mandatory, it really has no teeth, and it possibly is better so; better to have the good will of something short of all the school districts than to have the law universally enforced with a few schools antagonistic.

However, I am of the opinion that our law could have been more successful. A provision could be made for making and preserving records, if the county superintendent could be empowered to employ and pay a county inspector out of the general fund, and if our state superintendent had afforded the law the support it received from teachers and county superintendents.

Dr. Davis[1] said something about the big half-acre garden and the quart watering pot, but living in a smaller garden we can see that the tiny pot does a great deal of good, and in my particular city in Kansas, the school superintendent is for the law, he is for anything that is for the betterment of the coming generation. He would like to equip all the schools with a dental clinic to take care of the children. He would like to make a physical as well as a dental examination, and I believe the people all over the United States are for better health condition in our schools.

1. Davis, M. M.: Community Dental Service, J.A.D.A., July, 1924.

# ORAL HEALTH*

By JOHN H. KROPP, D.D.S., St. Cloud, Minnesota

EVERY one of mankind is in some degree of health or illness. The particular degree of health or illness of any individual is due to the operation of laws of Nature. In other words, those of us that are ill are ill because of one or more causes. The endeavor of men in health service is to determine the cause, and then, by eliminating the cause or causes for the illness, effect a condition of health. Today, this forms the foundation of the practices of medicine, surgery, and dentistry, collectively known as health service. With this in mind, I shall attempt to show the cause of much unhealthiness and suggest means for restoring health, and for building the health of the future generation.

So much has been said and written about diet that it has become confusing. While confused, we wonder if diet is of any real importance. Some tell us that milk is unfit for use unless it has been boiled or pasteurized. Others claim that the very important vitamins are destroyed by pasteurization or boiling, which causes it to lose its value. Dietitians tell us not to eat white bread or bread made of patent flour. Others cite examples of brawny men who live almost wholly on pancakes that are made of patent flour. Our doubt as to the importance of the regulation of diet is strengthened by the fact that we all live regardless of what we eat. Probably some of us have eaten the advocated balanced diet without feeling any better. Also, many of us have the incorrect belief that all that is necessary in a balanced diet is a good mixture. Is this true? and, furthermore, is a balanced diet of any importance? I can best answer these questions by citing an experiment conducted by the Wisconsin Experimental Station.[1]

Four groups of heifer calves were selected. All were, approximately, of the same age and weight, and in the same health and vigor. They were all confined to the same yard so that they all received the same amount of exercise and fresh air. As the lot was free of vegetation, their feeding was under complete control. All were allowed free access to sodium chlorid. One group was fed on the entire wheat plant, kernel and straw. Another group was fed on the entire oat plant. The third group was fed on the entire corn plant. The fourth group, the control group, was fed on equal parts of the three plants.

Records were made of the observations of the animals during their growth to maturity and during their subsequent life. All groups ate practically the same amounts, and digestion was about the same in all.

Now which group would you expect to be in the best condition at the end of a year if there was any difference at all? In all probability, the answer would be that the group fed on the mixture was

*Written for the Senior Student Thesis and Seminar Course, 1924, University of Minnesota.

1. McCollum, E. V.: The Newer Knowledge of Nutrition. The Use of Food for the Preservation of Vitality and Health, New York, The Macmillan Company, 1918.

the better because that is the general conception of a balanced diet—a mixture.

The fact of the matter is that at the end of a year of such feeding, the corn-fed animals were in far superior condition. They were in excellent condition, having sleek, glossy coats and abundant vitality. In marked contrast to them, the wheat-fed animals were rough coated, gaunt and small of girth, although the weight of all was about the same. The oat-fed and the mixed-fed groups were intermediate, being about alike.

This should be conclusive evidence that a dietary is of importance and that a balanced diet does not consist merely of a mixture. But let us follow this experiment farther. The reproduction of these animals is no less striking. The young of the corn-fed mothers were far superior to the young of the other groups in every particular, heavier, and more vigorous. In contrast, most of the calves of the wheat-fed mothers were dead when born or died within a few hours of birth. The following year, the same results were observed. Need anything be more convincing of the importance of correct diet? Probably the reason that so many weaklings are born to the human race lies in incorrect diet. It is safe to say that dietary shortcomings are the greatest contributing factors.

Aside from the fact that improper diet strikes at the reproductive powers, and general vitality and good feeling, diet plays an important rôle in the various deficiency diseases that actually result in death.

Pathologists have long known that a diet may have an appropriate chemical composition and yet be unsatisfactory for nutrition. Stale foods fed to prisoners and sailors have caused scurvy, which was immediately relieved by the eating of fresh fruits or vegetables.[1] The same condition prevails whenever we leave fresh fruits and vegetables out of our diet. I believe that today many people are suffering to a more or less extent from scurvy. Scurvy, I may add, is marked by large colored spots in the skin due to the extravasation of blood. These spots may ulcerate. Swelling and ulceration of the gums, and an irregular fever with great weakness accompany the red spots in the skin. We need no infectious source to contract this disease. All that is necessary to get it is to eliminate the anti-scorbutic vitamin from our diet. Thousands of experiments have proved this to be true.

Beriberi, believed to be caused by micro-organisms, is a peripheral neuritis resulting in paralysis, and is usually fatal. The predisposing cause of this disease is faulty diet. Experiments in the Japanese navy proved this conclusively. A cruise of eight months was taken and the incidence (40 per cent) of beriberi among the sailors was carefully noted. The diet was corrected, and another like cruise was made, with striking results. Today, owing to improved diet, beriberi is practically unknown in civilized countries. Chickens or pigeons fed on polished rice developed symptoms similar to beriberi, which proves that it is a disease due to improper diet. A chicken striken with beriberi and apparently in the grip of death has been seen to recover immediately on correction of the diet.[1]

How many of us are suffering with rickets and to what extent are we suffering with this deficiency disease? It is in evidence every day on any busy street. If we are not now afflicted, we may have been. It strikes the unborn child, the youth and the adult. Evidence of fetal rickets is seen in the mouths of many children. Evidence of acute rickets of childhood is found in the mouths of many adults, in their teeth. Rickets is marked by bending and distortion of the bones under muscular action, by delayed closure of the fontanels, pain in the muscles, sweating of the head and degeneration of the liver and spleen. There

are often nervous affections, feverishness and convulsions accompanying it. It is a disease in which the bones become soft and flexible from retarded ossification, owing to deficiency of the earthy salts or the inability to utilize the available supply of these salts.

Dr. E. H. Hatton, of Chicago, makes the following statement regarding these diseases:[2] "Infantile scurvy is distressingly present under modern conditions, and the prevalence of rickets is increasing under the same conditions."

Every dentist is familiar with the instance of the young mother who has come to him with a cavity in almost every tooth or a serious decalcification of most of her teeth. Questioning brings out the fact that, previous to the time that her baby was born, she had very little trouble with her teeth. The trouble was that her diet was deficient in calcium and the other earthy salts; her body was robbed of its calcium in order to have enough to produce the bony frame work of her baby. A plentiful consumption of milk and leafy vegetables, such as lettuce, would have made available a supply of earthy salts sufficient for both the growth of the child and the neutralizing of the acids that are produced in the mouth by bacterial action on carbohydrates. We cannot emphasize too much to expectant mothers the importance of correct diet.

The diseases that I have considered heretofore have improper diet as their cause. In other diseases, the condition is intensified by improper diet. Chief among these is nephritis, chronic interstitial nephritis and diabetes. The consumption of a single article of food that should not have been eaten has led to the immediate death of many diabetics.

By the term improper diet so often employed here, I mean an unbalanced diet, unbalanced not in the sense of chemical terms but as demonstrated by experimental feeding. Chemical science has given us an understanding of the nature of foodstuffs and the changes that take place in digestion; also an appreciation of the secrets of the metabolic processes that take place in the body. But chemistry must advance further before we can understand the secrets of metabolism. Nevertheless we have learned much from experimental feeding of animals carried out by investigators along nutritional lines. Results are interpreted from the animals' ability to develop or not to develop on the food consumed. Compiling the data on thousands of experiments has enabled investigators to give an approximate idea of what constitutes a balanced diet.[1]

A balanced diet must include protein with which to build up the muscles of the body or to restore the broken-down muscles. It must include fat and carbohydrates in sufficient quantities to furnish the required energy and heat. It must also include sufficient earthy salts to build and maintain the bony framework of the body. And, last but not least in importance, it must include the indispensable nutritive complexes called to the world's attention in 1910 by the Polish chemist, Funk and known as vitamins. It is the lack of these elements that causes scurvy, beriberi, rickets and other deficiency diseases.

Besides having nutritive value, the food that we consume should have sufficient bulk in the intestines to stimulate peristalsis, thereby promoting regular, normal defecation. If this latter phase of a dietary is disregarded, constipation will result. Constipation is a condition in which the fecal matter remains in the large intestine an abnormally long time. Bacteria of all sorts infest the large intestine, causing putrefactive decomposition of undigested proteins in the fecal matter. Regarding this condition, Jordan states:

> In general, it may be said that the action of bacteria upon proteins is very similar to the action of tryptic digestion, and results

2. Hatton, E. H.: Vitamine Deficiency Diseases and Their Relation to Dentistry, J.A.D.A., 9:762 (Sept.) 1922.

first in the formation of albumoses and peptones, which are then broken up into amino-acids. The amino-acids are excellent nutrients for bacteria as shown by Czapek, and are split both by the elimination of ammonia and by the splitting off of carbon dioxid. Free fatty acids, aromatic acids, and certain ptomains, cadavarin and putrescin, are among the further products of decomposition.[3]

These poisonous products of putrefactive decomposition are absorbed by the wall of the intestine and then are disseminated by the blood throughout the body, their presence often being very noticeable in the breath of persons so affected. These poisons are poured with the saliva into the mouth and again start for the intestine. If the intestinal tract is cleared, the poisons will be eliminated. But if the intestinal tract is still not cleared, as in chronic constipation, the poisons will again pass through the cycle, with their poisonous effect on the body, unremitting. The afflicted person will probably feel depressed, and many have headache or even more worse symptoms.

To avoid the form of constipation that is the result of weak peristalsis, coarse breads, fruits and leafy vegetables, such as spinach and cabbage, should be eaten. Large quantities should be consumed so that there may be the bulk necessary to stimulate peristalsis. If an excess of protein is eaten, the system is overloaded, and without any appreciable stimulation of peristalsis. Proteins do not stimulate peristalsis because they are easily condensed and carry little moisture. Coarse foods, such as bran, absorb and carry a much greater amount of moisture than they themselves contain before ingestion. It is this bulk of moisture carried by the coarse and the leafy foods that stimulates peristalsis and thereby promotes defecation.

Although the most prominent component of the body is protein, we do not need to consume large amounts of this substance because ordinary work consumes none of our body protein, and only small amounts of our body protein is consumed during very severe work. As it is impossible for the body to store any excess protein that we have eaten and as so little is needed for repair, most of the protein we eat is excreted in the form of nitrogen, and thus an unnecessary load is placed on the kidneys.[4]

Of the eighteen amino-acids that result from protein digestion, some are more important than others as food. We need to select for our diet the proteins that, on digestion, yield the most of the amino-acids that our bodies need.[1] Of the animal proteins, the animal's glandular organs such as kidney, liver, sweetbread, etc., stand out as a group of proteins of unusual value; this not because of their protein value but because of the vitamins that are also present in the organs. Milk is also included in this group. The fact that these vitamins are present in the animal's organs accounts for the fact that primitive peoples, such as the Eskimos, are able to exist on a strictly meat dietary. The Eskimo consumes the entire animal, thus getting a balanced diet. We get a balanced diet by eating only the choicer cuts of the meat for their protein and then get the vitamins from raw fruits, vegetables and milk.

Gelatin is the one common protein that is incomplete as a protein food. It lacks the amino-acids, tyrosin, tryptophan and cystin. Therefore, a diet having gelatin for the protein part will not prevent loss of body protein.[1]

Adequate protein can be obtained from a purely vegetable source, especially when used in connection with milk. The legumes, peas and beans, are particularly rich in protein, as are nuts, cheese and eggs.

Inorganic salts and vitamins are vital to life, although the ordinary person pays little attention to them in selecting his

3. Jordan, A. C.: Chronic Intestinal Stasis, New York, Oxford University Press, 1923.

4. Chittenden: Physiological Economy in Nutrition.

meals. We must have the salt to build up the bony framework of our body and we must have the vitamins to make the body capable of utilizing the salts. Vitamins apparently act as catalytic agents for without them the body cannot utilize available inorganic salts.

Inorganic salts are abundant in whole grains and raw vegetables. But boiling the vegetables removes 40 per cent of the salt and destroys the vitamins. The loss of the vitamins by boiling is not serious because they can be replaced by the consumption of oranges and other fruits. But the loss of 40 per cent of the salt is serious. To utilize all the salts of vegetables, the water in which they are boiled should be used in the preparation of soups and broths.

Soups and broths made in this way are quite essential to those people who eat only boiled vegetables. Soups sharpen the appetite and raise the temperature of the stomach as they are usually eaten warm. This warming of the stomach is beneficial, stimulating secretion of gastric juice and thereby preparing the stomach for the meal. In contrast, ice water restricts the movements of the stomach, inhibits secretion and thereby slows up digestion. Use of ice water should be discouraged, especially when consumed with meals. Too much water should not be consumed at meal time because at this time the stomach is being distended with food and the addition of water will cause overextension and lowered concentration of gastric secretions. Liquid refreshments should be taken one-half hour after meals and frequently before the next meal. This helps wash the food from the stomach into the small intestine for further digestion and for absorption. As warm water is beneficial to an irritated stomach, it is certainly not harmful to a normal stomach.

Regarding carbohydrates it may be stated that we all eat a sufficient amount. Our chief source of carbohydrates is in the sweets we eat and in the cereals and breads. Less sugar should be eaten and the bread we eat should be of the coarser varieties well baked. "Patent flour is one of the most deficient foods which enters into the human diet, being exceeded in this respect only by isolated foods such as starch, sugars, fats, or polished rice."[1]

Regarding the experience of individuals who, it is claimed have lived on diets considered faulty by dietitians, McCollum, who made the foregoing statement, says:

> It is unsafe to judge by the appearance or feelings of a man or animal under special conditions during a relatively small fraction of life, especially that part in which recuperative power and endurance are greatest. A dietary regimen which has proven unsafe for the promotion of vigor and health in animals is unsafe for man. Physical deterioration may, and generally is, unnoticed or not admitted until it is pronounced.

To be more specific as to what a good balanced diet is, let me say that it is a vegetable diet supplemented by milk, eggs and small quantities of meat.[1] If fresh lettuce or fresh fruit is included in the menu, the meat can be a muscle cut. But if fresh fruit or fresh vegetables are not included in the menu, the meat should be from the glandular organs. Unless a stimulant is necessary, coffee should be replaced by milk.

Milk is the most suitable single article of food. The fats of milk are rich in the fat-soluble A vitamin. Eggs are rich in fat-soluble B vitamin. Both milk and eggs are deficient in themselves. Pasteurized milk has had its water-soluble C vitamin killed. All milk is deficient in iron. Eggs are deficient in calcium and contain no carbohydrates. Eggs, milk and green vegetables form a very good balanced diet.[1]

As regards the relation of diet to dentistry, the old statement that "a clean tooth never decays" is not true. A clean tooth decays far less rapidly than an unclean one as can be seen in any mouth, where the inaccessible third molars

quickly decay in contrast to the teeth farther anterior. However, for the toothbrush to aid in maintaining healthy teeth we must have health to begin with. The teeth must be healthy in order to be maintained in a healthy condition. If they are already in a state of decay or decalcification, which is the first stage of decay, the toothbrush cannot bring back their health. Therefore, we must have healthy teeth to start with. In order to have healthy teeth to start with, the unborn child must be properly developed. Good teeth are born. If they are not born healthy, it will be impossible to make them healthy with a toothbrush. To have healthy teeth, then, we must insure healthy development in the unborn child by properly dieting the mother, and then maintain the teeth in a healthy condition in the youth by proper diet and by brushing. Prominent dentists have made the statement that a child that has a good healthy set of teeth at the age of 6 years will have a healthy set of teeth during all of his remaining life regardless of the care he gives them. But they do not advise discontinuance of the use of the toothbrush.

Let us for a moment consider the evil effects of caries. The cavity is filled with bacteria and decomposing food. The decomposing food is an ideal culture medium for bacterial growth. Odors therefrom are very disagreeable. Bacteria leave the cavity and are carried to the upper air passages and to the stomach and intestines. The harm they do at these places is dependent on their particular strain and on the patient's resistance to their advances. Soon the affected tooth aches, and the patient seeks the dentist. If the cavity can be filled without devitalizing the tooth, all is well and good until further decay causes a repetition of the foregoing. But if decay has gone so far that the pulp has become infected, necessitating surgical devitalization, the real trouble begins.

Dr. Weston A. Price has clearly shown that the devitalized tooth, whether it shows apical infection in the roentgenogram or not, is a focus infection and as such does damage to the body inversely proportional to the person's resistance to the bacteria.

On the other hand, removal of the tooth whose retention would necessitate surgical devitalization brings about the necessity for a bridge, and a bridge with its crowns reaching below the gum line and its unnatural coupling of two teeth, together with the unnatural stress on the abutment teeth, is an evil, although it probably is the lesser of the two evils.

Decayed teeth are a source of much systemic trouble. Their repair relieves some of the trouble, but it is much better never to allow them to decay. This can be accomplished by proper dietary regulation of the mother, of the child and of the adult; but the dietary regulation must start with the mother.

England's great men have concluded that that country could not produce enough dentists to care for their dental needs under existing circumstances. They believe that if the popular diet of the country could be changed to one having more vegetables, coarse foods and milk, with less pastry and sweets, the need for more dentists would be eliminated.

If we stop to consider that caries is not a primary but a secondary lesion; that it is the result of some other disorder, and that the effects of improper diet is the usual primary disorder, we will realize the necessity for dietary regulation.

# KEEPING THE HUMAN MACHINE IN ORDER

By WILLIAM BUTTERWORTH,* Moline, Illinois

SOME time ago, I read a story, important enough to occupy a first page place in a leading metropolitan journal, about what an American manufacturer, Samuel M. Vauclain of Philadelphia, president of the Baldwin Locomotive Works, was doing to keep in good health and attain a ripe old age.

"I pay my physician so much a year for keeping me well," said Mr. Vauclain. "When I get sick his pay stops. I don't have to worry; I let him do that. But I am careful to obey his orders. He examines me physically at frequent intervals and tells me what I must do to be saved."

Mr. Vauclain is doing the natural thing for a man of his type and education. He is an engineer. He believes in going over the human machine at least as thoroughly as one would have his motor car, or any other expensive piece of machinery, gone over by an expert at regular intervals.

I think that one of the reasons there are so many healthy and strong men among our manufacturers, bankers and merchants is because they are doing what Mr. Vauclain has recommended. They are having their human machinery examined and regulated. Their family physician thumps their chests, makes them open their mouths and say a long "A-a-a-h-h," taps them on their knees to test their reflexes, takes their blood pressure, makes the necessary tests for the presence of chronic interstitial nephritis ("Bright's disease") or diabetes and goes through the few other simple tests that tell him whether the organs are functioning properly—whether the human machine, in other words, is hitting on all six cylinders. Many lives are lengthened; many men are spared for important work, and the enjoyment of life does not end after one is 50. Decrepitude is halted for many long years.

### Value of Regular Physical Examination

I don't know who first made regular physical examinations popular among men of affairs, probably the life insurance companies. Possibly, the good old family physician had something to do with it. At all events, the practice is increasing and is most beneficial.

Now, if physical examinations are good for men of affairs such as Mr. Vauclain, they must be good for the rest of us. I have believed in them for years. They have been encouraged among the working force of the factory I represent. So when I heard that I had been elected president of the Illinois Association for the Promotion of Periodic Health Examinations, I accepted the office because I favored the health reform movement, if you can call it that, and was willing to help.

If physical examinations are good for the rich man, they are good for the poor man, who has just as much right as anyone else to enjoy good health and old age. The trouble is the average man and woman puts off calling on a

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physician till the last minute. Then it often is too late. It's a good deal like making a will. Many people defer it as long as possible. They hate to do it; possibly, they think they are going to die if they make their wills. And I dare say there are not a few persons who feel that if they have anything wrong with their interior mechanism, they'd much better know nothing about it. That's where they're wrong. If one of their physical screws is loose or something needs tightening, oiling or adjusting, it would be much better to know the nature of the trouble and fix it in time.

A doctor told me the other day that for every sick person on their lists, physicians have 100 well persons. This sounded encouraging until he added that many of the ones who thought their health was good had the germs of disease incubating in their systems, although preventive treatment would cure them. I am informed that out of the 110,000,000 population of the United States, only from 1.5 to 2 per cent have medical attention once a year.

One of the diseases that is being successfully overcome by medical examinations and proper treatment before it is too late is tuberculosis. The statement was made recently that should the declining rate in tuberculosis (which prevailed from 1900 to 1922) continue, the disease would disappear in 1955. Educational work in the treatment of tuberculosis certainly has paid large returns.

What has been done in tuberculosis we think can be done in the case of other diseases that are taking off so many of our people; such as, diseases of the kidneys, heart disease, pneumonia, maladies associated with high blood pressure and cancer. It is asserted by physicians that 70 per cent of cancer cases, if taken in time, can be cured by surgical operations. A report submitted recently at the annual meeting of life insurance presidents of New York showed, for last year, a death rate of 853.1 per hundred thousand in the United States and Canada, as compared with 834.5 in the corresponding period in 1922, and 828 in 1921. Influenza and pneumonia were among the chief causes of the increased number of deaths. Organic heart disease, cerebral hemorrhage and chronic interstitial nephritis also showed increases. Decreases were noted in typhoid fever, tuberculosis and cancer.

### Economic Consideration

American employers are interested in physical health examinations of their employes from a humantarian point of view; but there also is quite an important economic consideration, for it means a serious interference with plant efficiency when workers have to lay down their tools on account of illness. The illness of a single worker frequently throws out of gear the entire team of which he may be an essential factor. Putting a green man to work on the team often may reduce the output as much as 20 per cent. If there are five men in a team, at the present rate of illness among workmen, there are approximately thirty-five days every year when one or more members of the team are absent, cutting down the production of the team from 10 to 20 per cent during the thirty-five days. If the average loss each year for a worker was only five days, in place of seven, as it now is, it would mean a saving of millions of dollars to employers of the nation in increased efficiency.

A paper mill manufacturer with 600 employes reports an interesting experience with physical examinations, which were introduced because of compensation claims that the company felt were based on troubles originating prior to employment. Pleasant relations with their employes made it easy to obtain their acceptance of the plan.

### Details of the Examination

A part-time physician conducts the tests, and records are made covering the following points: sex, color, marital status, age, weight, height, eyes, ears,

nose, throat, teeth, gums, temperature, pulse, arteries, blood pressure, heart, lungs, abdomen, extremities, reflexes, urinalysis and genito-urinary findings. Up to July 1, 1923, 547 applicants were examined, and corrective treatment was prescribed in 154 cases. Among the defects discovered were 55 cases of hernia (36 being first degree, 7 second degree, and 12 third degree) 32 cases of venereal disease, 13 cases of suspected tuberculosis, 29 cases of pronounced diabetes and 27 cases of impacted wax in the ear. Of the 547 applicants, only two were refused employment. It is the company's policy to place men at the work for which they are best fitted by their physical capabilities and limitations. The applicants who needed treatment were told what to do in order to improve their condition.

### Examination of Teeth

Physical examinations should include regular examination of the teeth. It long has been known that neglect of teeth causes disease elsewhere, through infection. More than 100 years ago, Dr. Benjamin Rush, after whom Rush Medical College in Chicago was named, wrote a book on medical practice, and in the first chapter cites many cases in which patients suffering from rheumatism and other maladies were either cured or greatly improved by the extraction of teeth. More than a century ago, in England, examination of the teeth of school children was considered a routine procedure.

Teeth of the average adult appear to have been neglected judging from the evidence of 6,000 roentgenograms taken of the mouths of 600 adults of the average age of 28. These pictures showed more than 1,500 treated teeth and an average of five and one-half teeth missing for each person. Allowing for a few who never had wisdom teeth, we might say that an average of four teeth for each person had been extracted because of neglect of cavities. The same roentgenograms showed that 51 per cent of these 600 adults had infected areas at the ends of roots of one or more teeth, and 53 per cent had parts of the bone along the sides of the roots destroyed by the infective process known as pyorrhea. Of the entire 600, 78 per cent had one or the other or both types of infection. Nearly every leading physician will tell you that infections of the teeth are by far the most frequent causes of secondary infections elsewhere in the body.

The lack of attention to the teeth of children and of adults as well is resulting in a series of disabilities which are without doubt cutting short the lives of many people.

The Illinois Association for the Promotion of Periodic Health Examinations hopes to educate the public to the need of looking after the body machinery before it is too late. The board of directors is composed of representatives of the American Red Cross, associations that are fighting tuberculosis, the United States Department of Labor, dental schools, a life insurance company, the Illinois State Department of Health, manufacturers and physicians. All the reward they hope to obtain is a better standard of health for the entire community in return for the time and labor they will give freely to the cause.

Blanks for adequate physical examinations may be obtained from your family physician or from John M. Glenn, Secretary of the Illinois Association for the Promotion of Periodic Health Examinations, 76 West Monroe Street, Chicago, Ill.

# DEVELOPMENT OF STATE DENTAL CLINICS IN SOUTH CAROLINA

By E. A. EARLY, D.D.S., Columbia, South Carolina

AS this article is being written, the State Dental Clinics of South Carolina is on the eve of celebrating its first birthday. The department was authorized at the 1923 session of the South Carolina Legislature as a new feature of public health work in the state. The appropriation made by the Legislature was for only $2,500.

On this slender foundation, the new department was started, the work being placed under the department of rural sanitation and county health work of the state board of health, with Edward A. Early, D.D.S., in charge of the dental clinics. Following a program agreed on in consultation with Dr. James A. Hayne, secretary and state health officer, and Dr. L. A. Riser, director of the department of rural sanitation, the director of the dental clinics first visited North Carolina and Virginia, in order to study the state dental clinics as they had been organized and were operating in those states.

It was too late to get the clinics organized for the Spring of 1923, as schools were then closing for the summer vacation. Therefore, the director of the dental clinics devoted himself to the task of getting in touch with the dentists, physicians, school authorities and the general public, with a view to having everything organized for the clinics when school should open in the Fall. The response to the movement was immediate and most gratifying, the dentists in every part of the state taking the lead in making it a success and in winning for the clinics the support they needed. The director also attended the meetings of quite a number of state and district organizations, and addressed at least five schools in every county in the state. He has also spoken before scores of mothers' clubs, parent-teacher associations, associated charities, teachers' meetings and school improvement associations in the interest of the clinics. Since there was no legislative appropriation to cover the cost of the work which was proposed, it was necessary, first of all, to devise some system of financing the clinics. It was decided that it would be best to visit every county in the state and every school in each county in which the necessary cooperation could be secured, doing the work for children up to 14 years of age, or through the sixth grade, a county to be required to give a written guarantee of $600 to establish a clinic in that county. The initial expense of the clinic is $285. Of this amount, $250 goes for the salary of the clinician and $35 toward paying the expenses of the clinic. A fee of 50 cents, which is charged for each treatment, is pooled with the $600, and goes out in the payment of the expenses of the clinic. All children not able to pay for the work are treated free of charge, the fee to be taken out of the dental clinic fund. The $600 is raised through the office of the county superintendent of education in most of the counties, but in several counties the parent-teacher associations, the associated

charities, mothers' clubs, and improvement associations have helped raise this money. In one county, the county dental association guaranteed the money. In another county, the dentists pledged themselves not to work on children whose age admitted them to the clinic, so that the clinic could get all of this work. A treasurer is appointed by the county superintendent of education to take charge of the fund, it being stated that a responsible person must be appointed. No dentist in charge of a clinic and no member of a county health department is allowed to be treasurer of this fund.

The work was begun in the counties the first of October, 1923. The statistical report below covers the next five months:

| | |
|---|---|
| Children examined | 26,564 |
| Children treated | 5,972 |
| Amalgam fillings | 10,502 |
| Cement fillings | 1,348 |
| Porcelain fillings | 238 |
| Guttapercha fillings | 57 |
| Pulps capped | 15 |
| Cleanings | 4,310 |
| Extractions | 2,995 |
| Total number operations | 19,465 |
| Amount collected from pay pupils | $8,514.50 |
| Number free pupils treated | 458 |
| Total amount earned | $8,732.50 |

Of the 26,564 white children examined, 8,321 were above the age limit, and were advised to see the local dentist. Of the 17,043 children remaining, 5,972 children accepted the opportunity afforded by the clinic and were treated by the clinician. There have been also 1,200 colored children examined by three colored dentists, who started work January 15, 1924, and of this number 450 took advantage of the clinic.

It was hoped that with such a showing it would be possible to secure at the 1924 session of the legislature a much larger appropriation on the basis of the state allotting $500 to the work in each county that was willing to appropriate a like or a larger sum for the support of the dental clinics. The request for the larger state appropriation was enthusiastically supported by the dentists of the state and by the public spirited men and women, the women being the mainstay of the movement. Dr. David Aiken, president of the South Carolina Dental Society, and Dr. George W. Dick, chairman of the dental society's legislative committee, gave a great deal of their time in trying to get this bill enacted. It passed the Senate by a three to one majority, and a majority of the members of the House were unquestionably favorable to it, but the discussion of several big questions consumed a great deal more time than was anticipated, and under the rules of the House, it was found impossible to reach the dental bill on the calendar. For this reason, it failed; but the work is to go on during the year 1924, and it is expected that the fight for a larger appropriation will be renewed at the 1925 session next January. Though the state failed to make an appropriation for this work, many counties appropriated money for dental clinics, so that they could be held in these counties. In most instances, this action was taken in the counties in which the delegation had been given an opportunity to see the work at first hand and thus realize the benefits therefrom.

The Journal of the American Dental Association

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# *Editorial*

## THE MEETING OF 1924

This meeting promises in many ways to be a noteworthy one. The rapid development of the Association brings to each succeeding meeting its particular appeal and its peculiar problems. The appeal this year comes from the great state of Texas—the first time the Association has ever met within its borders. The men of Texas are putting forth every effort to entertain royally all the visiting members, and it is only due to these men that the membership turn out in full force and help the Texas profession add a far-reaching impetus to dentistry in that section of the country. Never before has there been a greater opportunity to do real missionary work in the upbuilding of dental association sentiment than on this particular occasion, and it would be a great mistake for the membership to fail to take advantage of it.

There are very many reasons why a large representation of the Association should attend every annual meeting. In the first place, it is only by regular attendance of large numbers that the *esprit de corps* of the organization can be kept up to the fullest degree. The impetus given by several thousand dentists in one gathering is no small factor in the maintenance of a real professional spirit, without which dentistry would fail to develop in its best and truest sense. This, then, is a duty of the individual members to the organization as a whole, and it is a duty with which every conscientious man must reckon.

But there is another side—the great benefit to the individual member himself. Few men stop to realize the many and varied benefits they gain from attending a meeting. Most of them reckon with the matter in terms of acquiring scientific knowledge, and some of them go so far as to minimize the necessity of attending in person, by making the remark that all the papers may be read later in print. Valuable as the printed matter may be, there is something inevitably lost when the element of personal contact is missing—in fact, the personal con-

tact is the most significant thing connected with Association membership. To hear an essayist present his paper is infinitely better than to read the same paper in print. Most papers will bear hearing and then reading afterward.

But to carry the matter still farther—it may seem heresy to say that the real value of a meeting does not after all lie in the scientific discussions. Important as these may be, there is something of infinitely greater worth in the elbow-to-elbow association among the members. To mingle sociably with old friends in the profession; to see the brightness in the eye, and feel the warmth of the hand clasp; to listen to the intimate experiences of kindred souls, with common aims and ambitions; to hear the laugh and see the smile; to share the triumphs and good fortune, and mayhap to help bear the burdens of disappointment; to be filled with the perennial glow of goodfellowship, and receive the inspiration of kindred interests in life—all of this is better than the acquisition of cold facts and the discussion of abstract theories—all of this elevates a man and makes of him a bigger, better and broader entity. It sends him on his way with fresh vigor and renewed resolve.

The greatest gain of any meeting is not the tangible one—it is the inspiration and the urge which comes from mingling in close communion with one's friendly fellowmen—it is the essence and not the material which after all counts for most. Let our members take stock of their past experiences and see if the thing most worthwhile which they carried away from previous meetings was not the soul instead of the body, was not the spirit instead of the substance.

No man can afford to hold himself aloof from association with his fellows, particularly those interested in the same pursuits. A hermit in our profession never accomplished very much, but many a man of ordinary native talent has raised himself to a plane of usefulness and distinction by imbibing freely of the enthusiasm to be gained by frequent intercourse with men of his own calling.

Ponder these things, and get ready to pack your grip for Dallas.

## THE DALLAS MEETING AND FUTURE POLICIES OF THE AMERICAN DENTAL ASSOCIATION

Our members who are interested in organized dentistry, which means dental progress, have had a rest since the conclusion of local and state meetings for the past year. It is now time to focus our attention on the Dallas meeting, which is but a few weeks away.

In the first place, I want to say that I am having a very intensive

extension course as president, and am confident I have a few more thrills coming before I present the gavel to Dr. Johnson at the conclusion of the Dallas meeting. Notwithstanding the strenuous activities and accompanying thrills of my office, I have not been accused, openly, of suffering from a disordered personality, so what I have to say may be taken as the truth.

It is a source of great satisfaction to me to be able to state that the dentists of Texas, under the leadership of the Dallas Committee on Arrangements, are working as one man to have every detail that will add to the comfort and pleasure of our members and visitors complete before the tenth of November.

The section officers have completed the programs for their sections, and if any of our illustrious past presidents can show me as good a program of the past, I'll present them with my Texas sombrero. I hope to meet more dentists under one roof at Dallas than have ever assembled together before.

Now about the future policy of the American Dental Association: The annual dues were increased at Cleveland last year. The money has been collected and is in the treasury, but will not be used until after the House of Delegates meets at Dallas. Some of the money was paid under protest, and since the Cleveland meeting, there has been considerable criticism raised regarding this proposition. In fact, last winter and spring, the temperature of the Association was hot and cold in spots, most of the time. Now, however, I believe the temperature is back to normal. The eruptions which followed the variations in temperature were empirically attributed to politics or selfish motives for the most part.

I want to say, however, that I had a complete history of the case, and politics or selfish motives had nothing to do with it. I am fully convinced, after running down clues all year, that every member who had anything to offer for or against the present and past administration of the Association was sincerely trying to aid dental progress. The whole controversy was based upon a difference of opinion as to how our future policy should be carried out and at the same time protect the organization. Personally, I have a great deal more respect and admiration for past administrations than ever before, and believe it is a good thing we suffered from this eruptive complaint, as it gives us an opportunity to strengthen our organization where it is weak.

I have some recommendations to offer to the House of Delegates, after submitting them to the Board of Trustees.

Our future policy regarding dental education, including mouth hygiene and public instruction, dental legislation, research work, re-

lief work, library plans; the work of our committees and commissions, including more explicit directions controlling our officers and THE JOURNAL, should all be considered. I would appreciate it very much if any member or component society having any suggestion of a constructive nature would take it up with the Trustee representing their district. This should be done at once; then, when we get to Dallas, these questions may be presented to the House of Delegates in proper form for their decision. When we leave Dallas, let every member boost for everything the House of Delegates decides is the right policy.

WILLIAM A. GIFFEN

## THE DEPARTMENT OF DENTAL HEALTH EDUCATION

Dental education should have dental leadership, and dentists must assist in educating the public in the laws of health, particularly as they affect the oral cavity and as the health of the oral cavity affects general health. Therefore, a Department of Dental Health Education has been established, with headquarters at the Chicago office, Miss Evelyn C. Schmidt being appointed director. This department, with the aid of the Committee on Mouth Hygiene and Public Instruction, plans to be a service station for professional, educational and public health groups by assembling and distributing authoritative educational material on dental health. The tentative program for the Department of Dental Health Education is outlined in a new section in this issue of THE JOURNAL. This section, which will appear monthly, will contain papers on dental health education, announcements of new material and notes on dental activities throughout the country, and will also conduct a question and answer column.

Since the organization of the department, most encouraging letters have been received from dentists and public health workers. Mr. Herbert Hoover, president of the American Child Health Association, wrote as follows:

> It is most gratifying to learn that the American Dental Association definitely recognizes its responsibility for assuming leadership in the field of dental health education and plans to provide a practical educational service for the health and educational professions, as well as for its own professional group.
>
> The eagerness of the health, educational and dental professions to keep abreast of the current investigations and successful administrative measures, to secure the soundest advice for children, and to avail themselves of the best means of educating the public regarding the importance of mouth hygiene, will certainly express itself in the requests for service which will be made of you.
>
> The almost universal prevalence of dental defects in our population, ignorance of their serious consequence and means of prevention are distressing conditions which your Association should bend its most earnest effort to overcome.
>
> I hope that the American Child Health Association may find ways to cooperate with you in so far as the work of the American Dental Association relates to children.

Dr. Taliaferro Clark, surgeon, medical officer in charge of field investigations in child hygiene, United States Public Health Service, wrote:

I am very much interested in the establishment of a Department of Dental Health Education in the American Dental Association and shall be pleased to do everything in my power to further this important work.

Congratulatory letters have also been received from dentists in all sections of the country who are interested in dental educational work. It is hoped that these expressions are forerunners of the sentiment of all, since the Department of Dental Health Education hopes to be the amicable echo of all dentists.

## REGISTRATION AT DALLAS

The House of Delegates at the Cleveland meeting in 1923 by unanimous vote passed an amendment to the Constitution and By-Laws to the effect that the General Secretary is not to issue an admission badge to any dentist living in the United States or its possessions who is not a member of the association.

ADMISSION TO MEETINGS: Section 1.—Admission to all general sessions, section meetings and clinics of the Association shall be limited to those persons who have received the official badge of the society, issued by the General Secretary.

Section 2.—The General Secretary shall issue membership badges to such members on presentation of their membership cards, or satisfactory evidence of the fact that such cards have been issued.

Section 4.—Guest badges may be issued to all visiting dentists from other countries, to physicians and to nondental friends of members, at the discretion of the General Secretary.

Section 6.—A guest badge may be issued to legally qualified practitioners of dentistry residing outside the United States and its possessions who present membership cards of recognized dental associations of their provinces or national organization from the country in which said member resides.

It is also very important that every active member bring his 1924 membership card, in order to avoid confusion and delay at the registration window.

## WHY DELINQUENT MEMBERS DO NOT RECEIVE THE JOURNAL

About three or four hundred doctors in Indiana who last year were members in good standing of the Indiana State Medical Association are now delinquent in their dues. Presumably these men know that on and after February 1st they were not members in good standing in the state Association, and consequently not entitled to medical defense at the hands of the Association for any malpractice suit

brought in connection with services rendered while delinquent. Furthermore these former members are not receiving The Journal, inasmuch as the post office department does not permit us to send The Journal to delinquents. As a matter of fact we are surprised to know that there are so many doctors in Indiana who are so careless and indifferent to their own interests that they will neglect as important a matter as keeping up membership in their county and state medical societies. Some of them make the excuse that they are provoked because of a raise in the dues, and every man who makes that excuse ought to hang his head in shame, for it does not speak well for his reputation as a person possessed of good judgment. The same men will pay their golf dues, cigar bills or the cost of many other unnecessary and foolish extravagances and never say a word. The only reason they object to medical society dues is that the dues are fixed by some of their confreres, and anything that comes from a confrere is looked upon with suspicion. It is high time that medical men improve their conduct in this direction.—*Journal of the Indiana State Medical Association*, May 15, 1924.

## NO REDUCTION IN SPECIAL TAXES

The proposed revision of the Revenue Act of 1921 was passed by the House of Representatives, February 29. No reduction was made in the war tax imposed under the Harrison Narcotic Act, nor were physicians given the right to deduct in the computation of their income taxes traveling expenses incident to attendance at meetings of medical organizations or expenses of postgraduate study. Unless the Senate acts favorably, the profession will be compelled to continue to pay annually, in time of peace, approximately a quarter-million dollars war tax, over and above the amount that would be collected under the normal tax of one dollar a year. The profession will be compelled, too, to resort to possible expensive and long-drawn-out litigation to defend its rights under the income tax law in the matter of traveling and postgraduate expenses, or to be continuously mulcted of the tax paid by the profession on such expenses. Having in mind, apparently, the strengthening of his position in refusing to recommend a reduction of the tax under the Harrison Narcotic Act, the Secretary of the Treasury has sought and obtained from the House of Representatives, and is seeking from the Senate authority to absorb in the execution and enforcement of the Harrison Narcotic Act the war revenue now

being collected under it. This means that he is endeavoring to procure an increase in the appropriation for its enforcement of from $750,000 a year to $1,250,000 a year, thus using up the ordinary excess revenue derived from the act. Obviously, there is no justification for assessing the cost of executing and enforcing this law against those who are taxed under it, as it is for the good of the public generally; but if the principle once is established, it will be difficult to modify or abolish.—*Journal of the American Medical Association.*

## DELEGATES' CREDENTIALS

Delegates' credential certificates will be sent to the secretaries of all state associations. The state secretaries will see to it that these certificates are signed and delivered to their respective delegates. It is necessary for each delegate to present his credentials, properly signed, to the Committee on Credentials at Dallas in order to be properly enrolled by that Committee, before he can be seated in the House of Delegates.

## OFFICIAL CALL

The Official Call of the Dallas meeting, together with the lists of the House of Delegates, will appear in the October issue.

# DEPARTMENT OF DENTAL HEALTH EDUCATION

## PLANTING DENTAL HYGIENE HABITS

**By SALLY LUCAS JEAN, Director of Health Education, and HETTY LOVEJOY SORDEN, Editorial Associate, American Child Health Association, New York City**

RECOGNIZING the value of competition in establishing health habits in children, an enthusiast for dental hygiene about fifteen years ago launched what has since become known as the Toothbrush League. This brigade, organized on the playgrounds of Baltimore City, marked one of the earliest milestones on the journey toward better teeth for children.

During the past fifteen years, much progress has been made along this line of march. That the pace has not been quickened even more may be attributed, for the most part, to the fact that educators, doctors, nurses, social workers, teachers, parents and even the dentists have not kept their minds focused clearly enough on the goal. Attention has wavered; the ideal has been hidden in a mist and no group has accepted the responsibility for directing an educational sunlight powered highly enough to clear away this mist.

As to the actual facts concerning the "dos" and do "nots" for physical fitness, we have all of that knowledge which carried the ancient Greeks to such pinnacles of strength and perfect physique. And, we have much additional information on sanitation and hygiene. We know, now, for example, that the proper diet of the pregnant mother very materially contributes to the formation of strong teeth for her baby. We know, too, how great an influence the nutrition of a young child has on the condition of his teeth throughout youth and adulthood. But we lack the one keystone element that carried the development of the ancient Greek's body to a point seldom achieved in modern civilization. This was his ideal of physical perfection. Until we grasp this ideal, until we cherish it and impart it enthusiastically and at the same time reverently to our children, the minds of this nation will be less keen, the bodies less sturdy and life less abundant than Nature has intended.

Before dental hygiene methods can be called truly effective, the ideal of beautiful teeth must be planted in the minds of children. Children must be made to desire beautiful teeth. Teaching emphasis must shift entirely away from the old negative stress on possible toothache and pain, toward pride in sound, strong, attractive teeth. When sets of teeth are to be shown to children, let these be perfect teeth, the *positive* in dental hygiene.

Negative teaching has long since proved its limitations. A child's mind is more permanently impressed by the happy effects of doing than by the warn-

ings of the possible unfortunate accompaniments of not doing. A girl is never too young to be appealed to, in the name of her personal attractiveness, to care properly for her teeth. The youngest boy can be enlisted as a member of the toothbrush brigade if good teeth are associated in his mind with a good game of baseball and other strong, manly accomplishments.

Pleasurable associations are potent aids to habit formation. Dr. Jessie Taft expresses this fact thus: "The new psychology of behavior tells us that the only way we can educate or reform is through the desires, needs, interests of the individual."

To make a child's visit to a dentist or dental clinic a happy, memorable occasion has been generally accepted as desirable. But the visit to the dentist or clinic is too often considered successful if the child submits willingly to proper dental treatment and leaves with no prejudices against a return visit.

For the most part, such visits represent neglected opportunities for securing the child's interest in the practice of vital health habits. Even under the most favorable auspices, the dental clinic is not using the benefits of modern child psychology. Dentists who specialize in children's work seldom utilize the teaching possibilities that the child's visit to them offers.

Going to the dentist or the dispensary is an event in the lives of most children. It is lifted high above the level of ordinary everyday affairs. It is an auspicious moment to make a pleasurable impression on the child's mind as to the desirability of any health habit, especially of habits of dental hygiene.

What are we doing in our dental colleges to prepare our student dentists for such educational work? What are we giving our dental hygienists to make of them teachers of health? We are putting into their hands the finest tools, and are putting into their heads the latest scientific knowledge of dentistry, but our present knowledge convinces us that all of this is not enough. Perfect technic, like the proverbial charity, availeth nothing if there is not back of it an understanding of child psychology. Perfect technic must be supplemented by effective training in health habits.

The dental college would do well to secure the services of a child psychologist who has the power to "get over" to the dentists and hygienists the best principles and methods for reaching the child.

A dental clinic that employs a teacher who understands the workings of a child's mind and who can give to the children during their visit to the clinic the best that the educational world has to offer adds an important link. Bright attractive literature should be available for distribution at the clinic. Ferguson's "Book of the Teeth" and literature prepared by the American Child Health Association will do much toward starting children to form good habits of dental hygiene. It would pay dentists in private practice to put such literature into the hands of their child patients. Its educational value is inestimable; its cost slight.

What are the public schools doing to encourage health habits in children? What can they do?

For a number of years, certain hygiene facts have been taught in the schools of the United States and indeed in most other countries of the world. Nevertheless, surveys and statistics prove that this teaching of facts has borne little fruit in health habit formation. It was not until further impetus was given that children began eating more wholesome foods, brushed their teeth more systematically or visited the dentist more regularly. The spur to health habit formation has come about only when definite effort has been set forth to this end.

One of the most interesting of the early

school dental hygiene experiments was conducted about twelve years ago, in a public school at Locust Point, a foreign settlement of Baltimore. This was a very definite project directed by the school health worker, with the help of one assistant for a short period, whose salary was paid by one of the state dental societies.

The aim of this experiment was to put into perfect condition the mouths of each of the 900 children in the school and at the same time teach and train these children to keep their teeth sound and clean, and to preserve the first permanent molar.

The happy result of this experiment was that practically 900 foreign children became enthusiasts for strong, clean teeth. By special arrangement, all necessary dental work was furnished at a clinic by senior students of dentistry. The children's visits to the clinic were made interesting, memorable and educational as each group of children was accompanied by a volunteer worker selected because of her interest and enthusiasm. Once their teeth were put into excellent condition, they cared for them regularly. In many a foreign home, they broke through the line of family tradition and practiced health habits never before known or respected; and because they did, the benefits will extend to their children.

Until a few years ago, it was considered that health should be taught in the schools by a specialist. Now we believe that the most effective, the most lasting health teaching is done by the teacher in the classroom. The best classroom health program represents a correlation of health teaching with every other subject in the curriculum.

A movement launched by the Child Health Organization, now a part of the American Child Health Association, about six years ago, has done much to vitalize all health teaching in the schools.

This organization introduced health to the school children as a new game, which was to be played according to definite rules. Today, this health game is being played in hundreds of classrooms, and the "rules of the game" have become common knowledge and common practice among thousands of school children. These are the "Rules of the Game":

A full bath more than once a week.

Brushing the teeth at least once every day.

Drinking at least four glasses of water a day.

A bowel movement every morning.

Drinking as much milk as possible and no coffee or tea.

Eating some vegetables or fruit every day.

Walking or playing part of every day out doors.

Sleeping long hours, with windows open.

Dental hygiene has had an important place in this health education campaign. Results are already being achieved, and many interesting classroom projects are being carried on by school children in their newly awakened interest in health ideals.

So much interest in hygiene has been stimulated by new health teaching methods that one of the large insurance companies has found it worth while to offer $25,000 to teachers in fifty individual scholarship awards of $500, for unusual attainments in this field.

In encouraging her children to form proper health habits, the teacher will want to study her children. When persuasion is needed, she will suit her argument to her child. Her appeal will always be individual. One little rebel may succumb to the toothbrush habit because she loves her teacher and this teacher cleans her teeth regularly. Another, though too discouraged to brush her teeth as long as she can notice no signs of improvement, may scrub away at them valiantly after a dentist has "taken the green off with his tickly little brush." Other children prove susceptible to other arguments. The teacher must ever be keen in her search for the telling truth. Above all things, she

must be sure that a toothbrush is within hand grasp of every child.

The tooth brushing habit may be given an impetus by a protected display of moderately priced toothbrushes offered for sale, standing up like soldiers in some prominent place in the school. This will not only encourage the buying of toothbrushes but will also suggest their hygienic care. Nearby should be some encouraging insignia and the low sales price. Toothpaste manufacturers frequently will provide samples for distribution; powder may be sold in small boxes, or common table salt may be recommended. In many classrooms in the country, each child keeps a toothbrush and saltcellar in school. After lunch, each day, he brushes his teeth. Toothbrushes are sold in this room, and at the beginning of the experiment samples of toothpaste were distributed to the children. When the samples were exhausted, common table salt was used.

As soon as a teacher can induce even a few of her pupils to form the toothbrush habit, and to talk about this habit, mass psychology will begin working for dental hygiene. Let tooth brushing become the popular thing to do, and the habit will be developed in American, Polish, Lithuanian, Scandinavian and Bohemian homes where a toothbrush has never before been seen.

Interesting class records and charts of daily health practices, including cleaning the teeth, are invaluable aids to good health habit formation. A gold star reward in the lower grades is a goal worth striving for.

Toothbrush races are becoming a very prevalent home and schoolroom sport. Woe be unto the child who causes his class to lag behind in the race because he forgets to clean his teeth in the morning. Classroom public opinion runs high in this respect.

Better Teeth Weeks are being observed in certain schools. Honor rolls are kept in many classrooms for perfect teeth, or perfectly repaired teeth, perfectly cared for. During Better Teeth Week in one school, a visiting dentist talked on the care of teeth and examined the mouth of every child. Later the school nurse did follow-up work, urging parents to take their children to the dentist. Arrangements were made at the community dental clinic for the care of the teeth of the children whose parents were unable to pay for treatment.

As part of a junior high school health project in Oklahoma City, dental literature was distributed recently in twenty-eight classrooms. This school was engaged in working out a fascinating project, a trip to Utopia, the land of Health. After each class ship had lifted anchor, it moved across the sea to this mythical land in the Mediterranean as fast as the unanimous practice of health habits permitted. Twenty-five miles on the voyage was awarded to each room as soon as every child's teeth had been put in good condition and the daily toothbrush habit had been formed.

In connection with this project, dental clinics were attended and a special rate for cleaning teeth was obtained from a city dentist, and a druggist offered a discount on all purchases of toothbrushes, toothpaste or tooth powder. Some of the pupils gladly earned the money to pay for their dental repair work.

Similarly, significant dental hygiene projects are being undertaken in other schools as a part of the general health habit teaching programs. Health education is now being considered as the first essential in education. In this new teaching, *facts* are playing the minor part; *habit* teaching the major part. It is vitally important that only such hygiene facts shall be taught as will aid in the formation of health habits. Many facts that will encourage eighth grade pupils to form health habits would be wasted ammunition as far as fifth grade pupils are concerned. To attempt to give the latter the full content of the facts presented to the eighth grade would

bore these younger children and would be ineffective.

There is no way to raise dental hygiene to the highest possible standard until we instill in the child's mind the desire to have a beautiful mouth. Once this desire is rooted, we must ever be on the alert for ways and means of keeping this interest alive and stimulated.

The socially minded dentist is absolutely essential to the success of such a dental hygiene program. He knows better than anyone else the standards of dental hygiene; he is the one to get these standards and the dental hygiene teaching content over to the public school teachers. Education authorities and health education authorities are earnestly seeking his cooperation in the next steps for a vital dental hygiene program for the schools.

## PRINCIPLES OF A COMMUNITY DENTAL POLICY*

(1) Dental care is essential to the maintenance of health, comfort, and working efficiency. It is an essential part of all public or private programs for the cure or prevention of disease.

(2) Dental needs are at present beyond the reach of existing financial resources and of available professional personnel.

(3) In view of the relatively limited facilities in personnel, plant and equipment than can be secured, compared with the mass of community dental needs, the use of all present and prospective facilities should be determined according to a carefully considered program; otherwise, misdirected effort and lack of definite results are certain to follow.

(4) A merely curative program providing care for decayed or diseased teeth cannot be carried through on a sufficiently complete scale; the prevention of dental decay and disease is the only program that offers hope for the future.

(5) Dental science and medical science have developed methods of preventive dentistry, the success and the economy of which have been demonstrated practically on a sufficient scale to justify their general application.

(6) In the determination of a program for any community, it is essential to decide upon two factors: (*a*) the types of dental work to be done and (*b*) the types of cases, that is, persons, classified by age or social condition, to whom the several sorts of work should apply.

### Dental Program for Children

(7) The primary application of preventive dentistry must be to the children.

(8) The test of any plan for children must be not only the number reached and the character of the results achieved for them, but the proportion reached in comparison with the total child population. The aim must be parallel to that of school education, which is to reach 100 per cent of the children.

(9) If, because of limited facilities, selection has to be made with regard to work to be done, it is important that children of the younger years be reached.

(10) If selection must be made in relation to kinds of service, general prophylaxis and hygienic instruction should come first. The hygienic instruction should include both mouth hygiene and general hygiene. Curative work comes second.

(11) The following principles have been shown in the Association for Im-

*"Community Dental Service in New York City" is the report of a survey of dental clinics and other organized facilities by the committee on Dispensary Development of the United Hospital Fund of New York. This report, prepared by Michael M. Davis, Jr. and Clare Terwilliger, contains the chapter on "A Community Dental Policy," presented herewith in which are set forth fundamental principles applicable to a community of any size in any section of the country.

proving the Conditions of the Poor of New York City demonstration discussed earlier, to be of practical value and to yield most results for the funds and effort expended.

(*a*) Prophylactic cleanings at least once a year, and twice a year if possible, for all children in the first five grades of school.

(*b*) Extraction of unsavable and diseased teeth to put the mouth in a hygienic condition.

(*c*) Prophylactic fillings (to prevent decay) in all first permanent molars.

(*d*) Nitrate of silver treatment to arrest decay in the deciduous teeth which are retained longest.

(12) Orthodontic service, because of its relatively great expense and the very limited dental personnel available for this difficult and highly specialized work, cannot be regarded as feasible for all the children who need it in any community. In any large community, however, or in any large dental institution, orthodontic work should be developed as far as possible as a service to children, and as a field for the education of dentists and technicians in this important specialty.

(13) A dental program for children is part of the general child health program.

(14) Tonsil and adenoid work should be viewed in the same light, not as an adjunct of a dental program, but as part of the general child health program, which is associated in many ways with dental care.

### Dental Program for Adults

(15) A complete program in either preventive or curative dentistry for all adults in the community is impracticable.

(16) In determining what dental facilities should be provided for those adults who cannot secure all the dental service that they need from private dentists, the following order of urgency or importance should be maintained:

(*a*) Dental service for relief of pain.

(*b*) Dental service to persons who are under medical care and whose dental conditions are inseparably associated with their general medical problems.

(*c*) Dental service required in the education of dental students and dental hygienists.

(*d*) Reparative dentistry of a palliative nature.

(*e*) Dental prophylaxis including cleaning and instruction. Dental prophylaxis, however, should always accompany work under (*b*).

### Relation Between Private Dental Practice and Organized Dental Facilities

(17) As to the relation between the dental program and private dental practice, preventive dentistry cannot be expected to develop as an adjunct of private practice except for that small proportion of the population who have ample means. Preventive dentistry must be dealt with by public and semipublic facilities, in dental institutions or in local or school clinics.

(18) Similarly, curative dental work for both adults and children cannot be handled by private practitioners for a large part of the population, who must be provided for by public or semipublic clinics.

(19) Dental service in clinics should be salaried.

(20) There is no reasonable ground for opposition on the part of private dental practitioners to the development of a preventive or reparative dental program, on a public or semipublic basis, since there is more work to be done than present and prospective dentists can possibly undertake working as individuals.

(21) Financial Policy: Service for Children. In the maintenance of organized dental service, preventive dentistry for children should be open to all chil-

dren of school and preschool age on the same terms as is public education:

(*a*) With respect to the cost of this service, it should be borne in mind that the estimated cost of tooth cleaning and of instruction in mouth hygiene to children on a large scale is less than 5 per cent of the usual per capita cost of school education, and is a measure which will make more efficient the other 95 per cent expended.

(*b*) Private organizations maintaining a preventive dental program for children may properly charge stated fees, which should not exceed cost of the service and which usually must be considerably lower than cost in order to reach all the children who need it; and which should always be remitted to those unable to pay.

(*c*) For dental care other than prophylaxis, a charge should be made in the clinic, including an admission fee and in addition charges for materials used for fillings, anesthesia and other purposes; these fees being remitted when necessary.

(22) Financial Policy: Service for Adults. Clinics should charge fees covering the cost of the service, but these should be remitted to persons seriously in need of the service and unable to pay for it.

### Community Organization

(23) The following general principles are advisable. Prophylactic work for children should be localized in execution but should have centralized professional supervision; curative work, particularly the more elaborate forms, for adults and for children, should be centralized in institutions serving as large population units as possible; some of the simpler forms of curative work may also be in local clinics. In general, community organization of dental service in a large city requires four types of facilities: central institutions; district clinics; prophylactic stations, and hospitals and outpatient departments having dental services.

(24) In a large city containing one or more dental colleges, there should be at least an equal number of central dental institutions, each of which should be affiliated with a dental college and also with a general hospital and with medical education.

(25) The central institutions should be the scientific and supervisory center of both prophylactic and curative dental service for the community, but the work actually done within its walls should be primarily for curative dentistry, dental research and dental education.

(26) It is inadvisable to set up institutions which by terms of gift or endowment are restricted to children. An expensive plant and equipment can in many instances also render valuable and needed service to adults at periods which do not conflict with the use of the building for children.

(27) It is undesirable to centralize in one institution curative work for the children in a district of more than 250,000 total population; instead the central institution should be supplemented by branches or by clinics attached to hospitals or to educational organizations that have a professional affiliation with the central institution though not necessarily the same administrative control.

(*a*) Where a population is highly congested, as in certain large cities, an area including possibly as much as 500,000 total population might be served by a single central institution.

(28) Prophylactic and educational work for children should be decentralized, and should be done through local agencies, primarily the school system.

(29) Experience has shown that localized dental service, as in small unattached clinics or in schools, cannot be

maintained at a high level of efficiency without continuous and detailed dental supervision from a professional source of recognized authority.

(30) The benefits of localization of the prophylactic work for children are both financial and educational.

(*a*) A substantial saving in cost of plant and equipment is achieved by doing the cleansing of teeth in the schools where the building overhead is already carried, and where equipment, being solely for children's prophylaxis, can be of simple and relatively inexpensive character.

(*b*) A large saving in transportation expense, in incidental inconveniences, in danger to children, and in loss of time by escorts is achieved through decentralizing the prophylactic work, which should reach 100 per cent of the school population.

(*c*) Intimate local connection between the prophylactic work and the school system increases for children and parents alike the educational weight of the dental program; and links it more closely with the general child health progress than is possible in any other way.

(31) The prophylactic dental work in the schools should be under centralized professional supervision. The staff of a central institution, or one of the central institutions associated with dental colleges, should provide this professional supervision directly, or through one of its branches.

(32) The expenses of a community dental program are at the present time fairly to be divided between the community (local government) and private individuals such as the board of trustees of the dental institutions and their financial supporters. The first charge upon the municipal interests is dental prophylaxis for children, and, given the right start, an increase in public readiness to assume financial obligations for the support of other branches of community dental service should follow.

### Educational and Medical Institutions as Parts of Community Dental Program

(33) Schools. The center of the preventive dental program for children should be the public school system.

(34) Hospitals and Outpatient Departments. The center of the curative dental program, so far as such a program is practicable, should be the hospitals and their outpatient departments.

(*a*) In communities having dental colleges, the dental clinics or infirmaries connected with these colleges also form parts of this program.

(35) District Clinics. Local dental clinics established under public or private auspices, unattached to hospitals, or as parts of health centers, should each serve a definite area, emphasizing preventive work but supplementing both preventive and curative programs according to the needs of their districts.

### Dental Service in Hospitals and Outpatient Departments

(36) The hospital and outpatient department cannot be expected to provide dental service for the community as a whole, or for all the population of the area which it serves. The responsibility of the hospital and outpatient department is primarily to provide dental service for persons who are under medical care and whose dental conditions are associated with their medical problems.

(*a*) Under the policy indicated above (34), the dental clinic in the outpatient department of the hospital becomes the chief organized dental service for adults, supplemented by local health centers and clinics unattached to hospitals, and by the clinics or infirmaries of dental colleges.

(37) Diagnostic Service. Dental serv-

ice is needed by the hospital and outpatient department as an element in the diagnosis of many disease conditions in general medicine or in the specialties.

(38) Dental Care. Every hospital and outpatient department should provide or arrange for dental service for every patient whose medical condition requires it.

(39) Routine Dental Examinations. Dental examinations of all patients are desirable as a part of the routine physical examination.

(40) Every general hospital should, therefore, have a dental service or department, including opportunities for oral surgery in the house and for ambulatory service through a dental clinic in the outpatient department.

(41) In such dental clinics the charging of fees covering cost of service is desirable, as indicated above (21*c*). In some instances, it is well to have these pay clinics held at certain periods of each week, other hours being assigned to sessions charging nominal or no fees. Under other circumstances, it may be best to have no separation between these two services, fees being remitted in whole or in part to patients unable to pay.

(*a*) Standards and procedures for admitting to dental clinics only such persons as are unable to pay private dental rates for the services which they need should be established, conformable with the practice of outpatient clinics in the various branches of medicine and surgery.

(42) In view of the recent development of dentistry in association with medicine and of its introduction as a service into hospitals and outpatient departments, it is desirable that standards for the organization and conduct of dental services in hospitals and clinics be prepared and promulgated. Dentists, physicians and administrators should participate in the formulation of such standards.

### Relations to Education and Research

(43) Research into the conditions and causes of dental decay and into the methods of its prevention is of fundamental importance. The entire program of dentistry may be radically changed by future discoveries of specific causes of dental decay and agents of infection. Definite provision for research is supremely important in any program for a community large enough to support a dental institution of the first rank associated with medical and dental education.

(44) The cooperation of students of dental colleges in connection with community dental service is both a measure of public economy and an educational advantage to the future members of the profession.

(45) The teaching of dental hygienists should be an integral part of a community dental program in any community of size.

(*a*) The function of the dental hygienist will require study and possibly redefinition as time goes on, particularly with regard to the part to be played by the hygienist, on the one hand, as a technical assistant to the dentist in cleansing teeth, and on the other hand, as an instructor in mouth hygiene.

(*b*) It is desirable that the development of dental hygienists shall not interfere with the instructive functions of the school teacher and of the school nurse. The school system cannot be expected to support a double set of health educators. Instruction in hygiene for school children should not be dealt with by a series of specialized instructors.

(46) The education of all nurses and other public health workers should include subject matter in dental hygiene.

## THE NEW DEPARTMENT

The Committee on Mouth Hygiene and Public Instruction takes particular pride and pleasure in announcing to the members of the profession who are especially interested in educational work in mouth hygiene and to the profession as a whole, the establishment of the Department of Dental Health Education, located in the offices of the General Secretary, in Chicago.

This, the accomplishment of one of the first objectives of the Committee, is believed to be an important step in the right direction. While the department is intended to serve as a distributor of information regarding educational and publicity campaigns, it must be realized that it is now in its infancy and may not be able for some time to meet the demands that will be made on it. However, it is hoped that this new department will be considered the profession's very own, to be drafted on at will; and that the more advanced sections in mouth hygiene educational work will contribute to the department material and ideas that have proved successful. All such contributions will be gratefully received, and may prove a blessing to others.

This department has been made possible by the action of the Trustees while in session in Chicago last March, their action being based upon the report and showing made by the Committee on Mouth Hygiene and Public Instruction.

Miss Evelyn C. Schmidt, the director, was formerly with the Massachusetts Department of Public Health where she organized and was in charge of the work in mouth hygiene.

The members of the Committee sincerely hope that all interested in the work being done by this department will make use of the opportunities offered, and they bespeak for Miss Schmidt full cooperation.

W. R. WRIGHT, *Chairman*
HARVEY J. BURKHART
GUY S. MILLBERRY
E. L. PETTIBONE
OTTO U. KING

## PROGRAM OF THE DEPARTMENT

Any program is a matter of evolution; therefore, time is the determining factor. Later, it may prove expedient to change some of the details of the program of the Department of Dental Health Education, but the fundamental aims and policies, sponsored by the Committee on Mouth Hygiene and Public Instruction, will probably remain as briefly outlined.

The Department purposes to act as a service station for professional, educational and health groups, at which information and educational material on dental health may be obtained. The material distributed by the department will be nontechnical in its presentation, dealing with the positive rather than the negative, the constructive rather than the destructive, the health rather than the disease phase of the problem. Through the courtesy of dentists and official and unofficial health representatives, the department will be enabled to keep in touch with and to publish dental activities throughout the country.

In an endeavor to arouse interest in the matter of dental health, the following mediums will be employed: THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION—Section on Dental Health Education; motion pictures; still pic-

tures; radiocasting; newspapers; pamphlets, reprints and flyers; posters; lectures; exhibits; health days and dental campaigns. As material of various types becomes available, announcements will be made in THE JOURNAL.

The success of the work depends not on any individual or group of individuals but on every state and local society and on the individual dentist; and they are the connecting link between the department and the public.

EVELYN C. SCHMIDT, *Director*

## THE DENTAL HEALTH EXHIBIT AT DALLAS

It is not possible at this date to give a detailed report of the varied program to be presented by the Committee on Mouth Hygiene and Public Instruction at Dallas. However, a brief outline will serve to give a general idea of plans for the exhibit.

The mouth hygiene educational exhibit, which met with such general favor, at the last two meetings, will be repeated on a larger and improved plan. The number of state, city and institutional exhibits will be materially increased. The Texas exhibit will be one of the features, presenting varied mouth hygiene activities from twenty-five or thirty communities in that state. Another feature of the general exhibit will be an exhibit prepared by the Department of Dental Health Education, which will demonstrate a number of methods of teaching mouth hygiene to the public, and will give an idea of the work accomplished, and of the general program outlined for future work of the department.

Plans are under way looking toward the radiocasting of a number of talks by leading advocates of mouth hygiene. It is also planned to have newspapers run prepared articles from day to day. All lunch clubs will be supplied with interesting speakers during the session.

Each member and visitor of the American Dental Association is cordially invited to each feature of the program.

W. R. WRIGHT, *Chairman,*
Committee on Mouth Hygiene and Public Instruction.

## THE MINNEAPOLIS DISTRICT DENTAL SOCIETY EDUCATION PLAN

Realizing that educating the laity in dental health is a matter not of one sporadic campaign but of continuous and continued campaigning, the Minneapolis District Dental Society, two years ago, mapped out a systematic plan of education. First, an excellent exhibit presenting various phases of dental health was produced. This exhibit is the property of the Minnesota State Dental Society. It is sent to fairs throughout the state and loaned to local organizations. Now a newspaper publicity campaign is being conducted. A writer of popular health articles has been employed to present the various dental health subjects, and articles are now appearing in the Minneapolis Journal. Some of the subjects are:

Tooth for a Child—Myth
Teeth Building Materials
What the X-Ray Tells the Dentist
The Three V's that Help Keep You Well
Where Calcium for the Teeth and Bones Comes From
Breast Feeding
Reasons for Filling Children's Teeth
When to Take the Child to the Dentist

These are but a few of the many articles, which are written in popular, convincing and appealing style. Each article carries the following announcement also:

The Journal has established this department in cooperation with the Minneapolis District Dental Society.

The purpose of this department is to give information in regard to dental health, to arouse necessary interest in this important health field.

If you want advice or information on any question of mouth health, write to the Mouth Health Department, Minneapolis Journal, enclosing a stamped, addressed envelope. Your questions will be gladly answered.

Every article brings many letters with general questions on mouth hygiene, for many people are anxicus to receive authoritative information such as this service offers.

Other state dental societies might well emulate the example set by Minneapolis.

## TOOTHBRUSHES FOR ORAL HYGIENE CAMPAIGNS

In order to further oral hygiene campaigns, three toothbrush manufacturers have agreed to supply children's size toothbrushes at actual cost. These brushes are sold only to health officers, oral hygiene workers and others working with school children.

This work is being done under the auspices of the Oral Hygiene Committee of Greater New York.

All communications should be addressed to Thaddeus P. Hyatt, D.D.S., 1 Madison Ave., Room 9082, New York City.

## SECOND ANNUAL MEETING OF THE AMERICAN CHILD HEALTH ASSOCIATION

The program of the second annual meeting of the American Child Health Association in Kansas City, Mo., October 14-16, is designed to cover the entire range of child health including the prenatal period. The speakers will deal with the subject of child health in its special interest to public and private officials, governmental and extragovernmental agencies and with the teaching, nursing and medical professions.

## NEW DIRECTOR OF HEALTH EDUCATION

The American Child Health Association announces the appointment of Miss Emma Dolfinger as director of the association's health education division.

## STATE DENTAL HYGIENISTS APPOINTED

The Maine State Department of Public Health has appointed Miss Dorothy Bryant state dental hygienist, and Miss Madeline Shipton has accepted a similar appointment with the Connecticut State Department of Public Health.

## BETTER TEETH STORIES

Children need stories whether it be the child who is waiting in the dental office or the child in the schoolroom. A story offers a fascinating and interesting manner of teaching health.

The Department announces a group of seven "better teeth" stories for children. Price 35 cents.

## MOUTH HYGIENE FILM FOR SCHOOLS

### Tommy Tucker's Tooth

The "Tell-me-a-story lady" is pictured with a group of children as she tells them the story of two boys. They were playmates and went to the same school, but Tommy Tucker had been taught to and did care for his teeth, while Jimmie Jones neglected his.

The story is simply told and appeals to children. It brings out three reasons for good care of the teeth.

1. Neglect causes toothache. Jimmie's neglect brings toothache. Animated diagrams show how decay is caused and pain follows.
2. Good teeth mean better health. This is brought out by a gymnasium scene where the two boys are examined. One is normal and the other is underweight.
3. Good teeth make one better looking. The boys apply for a job. Tommy's neat appearance with clean, sound teeth contrasted with Jimmie's careless one with unclean and decayed teeth, gives Tommy the job. The employer, in a straight-from-the-shoulder talk to Jimmie, tells him that carelessness in the care of teeth and in dress means that one is more liable to be careless in his work. Jimmie follows his suggestions, has his teeth

fixed and cleans up, and returns and is given a position too.

There are animated scenes demonstrating a very effective method of brushing the teeth, also demonstrated by Jimmie.

The author and producer is Dr. Thomas B. McCrum, 4144 Charlotte, Kansas City, Missouri. The price is $65.00.

## YOUR EXHIBIT AT DALLAS

When the annual session opens in Dallas, the Department of Dental Health Education will be six months old and will be beginning to stand on its own feet. This service station will have something to offer you in the way of Dental Health educational material. There will be charts, graphs, slides, pamphlets, etc. Be sure to look us up!

## DENTAL CARIES

### Economic Aspect from Social Service Viewpoint

Case 38. Poor family. Margaret had indigestion. Could not afford to pay for refitting of her artificial teeth, which did not fit properly and caused her difficulty in chewing. Three weeks' rest in country, a new plate, and Margaret gained 14 pounds and felt better. Able to work. Case 49. Dental work arranged for. Similarly with dental treatment which comes especially into question in the case of Margaret Dolan, whose dental defects and indigestion complicated a mental situation which was itself the result of a well-founded wrong. Despite all Margaret Dolan's financial trouble and the death of her sister, she recovered with social aid. Another dental case was that of Nathal Rosenthal. The dental complication was subordinated here also, but this always subordinate influence was still important. Social workers so often ask what the effect of dental treatment is upon mental diseases; owing to the fact that extraordinary claims have been made on behalf of dental work (especially extraction) in cases of mental disease. The public prints have in recent years been full of such claims. The rational answer to this question is that a few cases are marvelously benefited by proper dental treatment. These improvable cases are no doubt those in which pyorrhea or other infection about the teeth is responsible for mental symptoms through a process of septicemia (with bacterial invasion of the blood) or toxemia in which bacterial poisons find their way into the blood. Michael Piso (Case 62) suffered extensively from pyorrhea but the dental treatment thereof was only a part of the total treatment of Piso which served in the end to raise his wages and procured relatively complete family adjustment with abolition of jealousy.—Southard and Jarrett, "The Kingdom of Evils."

## RECENT HEALTH PUBLICATIONS

*Listen In:* A series of radio health talks written under the direction of eminent public health experts and delivered by Henry Copley Green, Boston Metropolitan Chapter, American Red Cross, 73 Newbury St., Boston; price 25 cents, postpaid.

*"Your Teeth."* By R. S. Towne, D.D.S., Bismarck, N. D. Published by the W. M. Welch Manufacturing Co., 1516 Orleans St., Chicago. Price 40 cents. A textbook on mouth hygiene for the classroom or the home, covering nutrition and the home care of the mouth, and describing the dental tissues and the diseases of the dental tissues.

# Medical and Dental News

## ALABAMA

**Alabama Boys' Industrial School:** At the industrial school, at East Lake, a review of three and a half years shows the following conditicns regarding the condition of the teeth of newly admitted boys: 3 per cent of these boys do not need dental care and have clean teeth; 8 per cent do not need dental care, but the teeth need cleaning; 13 per cent need extraction and cleaning of teeth; 24 per cent need extractions, fillings and cleaning of the teeth; 52 per cent are in need of fillings and cleaning of the teeth. An idea of the amount of work done in the clinic connected with the school may be gained from the following figures: Number of boys examined, 1913; number given care, 1,010; extractions including a large number of deciduous teeth, 869; number of cavities filled, 2,007; special dentures, inlays, bridges, etc., 10; roentgen-ray examinations, 42; treatment for pyorrhea, 19 patients; orthodontia, 1.

## CALIFORNIA

**Medical License Investigation in California:** California, like Connecticut, is now endcavoring to free herself from diploma purchasers and other incompetents who, in some way or other, have obtained licenses to practice medicine in that state. If the investigation follows a well considered plan, such as is evidently being followed in Connecticut, much good should result. According to present reports, however, graduates of all medical schools in Missouri are to be debarred from licensure in California—a ruling that is unjust to the three reputable, high grade medical schools in St. Louis and Columbia. The investigation is including not only the graduates of the inferior medical schools of Missouri and those holding credits from the supposedly defunct Pacific Medical of Los Angeles—reported to have been involved with the Missouri diploma-mill ring in issuing credits—but also the graduates of low grade medical schools in Boston, Baltimore, Chicago and elsewhere. While the cooperation of the Missouri state board of health has apparently been promised, the reports criticize the Missouri board for recognizing credentials of the low grade medical schools in Missouri, a blame that is not deserved, since graduates of these schools were refused recognition by that board until 1921, when a change in the medical practice law forced such recognition. The reports state also that licenses issued in Missouri are to be refused recognition by California. Such refusal will doubtless affect also the certificates issued in Arkansas and other states where licenses have so liberally been granted to graduates of medical schools long known to be of inferior grade. California, like Arkansas, Missouri and other states, needs the vigorous housecleaning in medical licensure that is being undertaken. The action taken will be no less effective if it deals justly with graduates of reputable medical schools and, at the same time, mercilessly exposes those who, by irregularly securing diplomas or licenses, have obtained state authority to prey on the sick.—Journal of the American Medical Association, July 19, 1924.

## GEORGIA

**Southern Dental Clinic:** At the third annual clinic of the First District Dental Society, Savannah, Ga., papers were read at the morning session and clinics were held in the afternoon. After adjournment, the members and visitors drove to the Shriner's Country Club, where the annual banquet was served. The following day was given to a fishing trip.

## ILLINOIS

**Free Clinics a Success:** The free dental clinics for children established nine months ago by the county board at the Cook County Hospital, Chicago, are reported to be highly successful. The Chicago Dental Society cooperated in the

project. Nearly 10,000 children in the county have received treatment at the clinic, the number now exceeding 1,000 a month. The success of the clinic emphasizes the need of extended facilities to care for the teeth of the poor children of the county.

**Survey of Tooth Conditions at Anna, Illinois:** The superintendent of public schools at Anna recently secured the cooperation of the local dental profession in making a survey of teeth conditions in all school children. The superintendent supplied each child with a record blank and the dentists examined the teeth free. It is reported that practically 100 per cent of the children have been examined and that the dentists have so much work to do that they keep evening hours. Few things could work to greater advantage to everyone concerned.—Illinois Health News.

**Club for Chicago Physicians and Dentists:** According to present plans, Chicago physicians and dentists are to have "the most magnificent club of its kind in the World," a fifteen story Grecian temple on Lake Shore Drive, a short distance from the new Northwestern campus and its contemplated medical-dental group. The total investment will be about $2,000,000. It will be the home of the Chicago Medical and the Chicago Dental Societies. Membership will be limited to 3,000. Ten of the fifteen stories will be erected next spring, and the club will offer to its members a large auditorium, banquet hall, grill room, ballroom, library and sleeping quarters.

## MINNESOTA

**Teeth of School Children:** In an examination of more than 4,000 school children in Rochester and Olmsted counties, Minnesota (Donald C. Mebane, in American Journal of Public Health, August, 1924), observations as to the time of eruption of the permanent teeth were made on 3,000 children between the ages of 5 and 13. There was marked irregularity in the time of eruption. In one case all four 6-year molars had erupted at the age of 5, and in another they were not in place until the age of 7 years and 9 months. All twenty-eight permanent teeth were erupted sometimes as early as 9 years and 9 months, and sometimes as late as 13 years or over. In fifty cases of marked rachitic chest deformity, the limits in the time and the average time of the eruption of the permanent teeth did not differ from the general findings. There was marked variation in the order of appearance of the different permanent teeth. Severe malocclusion was found in 345 children. Half of those examined had moderate occlusion. The absence of certain teeth was rarely a factor in malocclusion. There was an absence of certain permanent teeth in only twelve of the 4,000 examined. In eight of these children, the missing teeth were upper lateral incisors. In only one child were supernumerary teeth present, these being two upper lateral incisors. Various forms of aplasia were seen in the permanent teeth. The so-called collar and sleeve deformity, of which the mulberry molar is a 6-year molar manifestation, was present in twenty children. In none of these cases was there a history of stigmas of syphilis. Defective enamelization in the form of severe multiple pitting was present in only ten of the children. Four of the thirty children with dental aplasia had low intelligence quotients. The so-called fifth cusp was frequently seen on the upper deciduous molars, on the upper 6-year molars, or on both. It occurred in half of the children. Extreme variation in the size of this cusp was noted. A study of the permanent upper central incisors has also been made on account of the importance of these teeth in the diagnosis of congenital syphilis. It was found that in 12 per cent of children, digitations were present, regular and of full height. In 48 per cent, the digitations were slight or absent, and the biting edge of the tooth straight and even. In 40 per cent, the digitations were irregular, or the biting edge was irregular and uneven. In this last group, the teeth often resemble Hutchinson's teeth, and are therefore occasionally responsible for the incorrect diagnosis of congenital syphilis. A definite diagnosis of congenital syphilis cannot be made from the teeth unless there is a central concavity on the biting edge. Converging sides instead of the normal diverging sides and anteroposterior thickening are important, but the former occurred in 12 per cent of normal children. Dental caries was by far the most common and serious of the defects, being found in 1,077 city children and 1,782 country children. Of the children with sound teeth, only 22 per cent were more than 7 per cent underweight, while of those with decayed teeth, 30 per cent were underweight. As the 6-year molars are the keystones of normal occlusion, decay of these teeth was especially noted. Seventeen hundred children had cavities or fillings in these teeth. It was observed of the younger children,

with only one or two 6-year molars decayed, that the other 6-year molars, as yet undeveloped, were usually poorly developed. Broken-off permanent incisors were observed in eleven children. All but two of these had decayed 6-year molars, which would seem to indicate that poor development, as well as trauma, was a factor.

## NEBRASKA

**Nebraska Bans Alien Physicians:** At a meeting of the state board of medical examiners in Omaha, June 8, a resolution was adopted that no physician who has not taken out his first citizenship papers or who is unable to pass an examination in English will be permitted to practice in Nebraska. A similar resolution, aimed at alien pharmacists, was recently adopted by the state pharmacy board.—Journal of the American Medical Association, July 5, 1924.

## NEW YORK

**Dentists to Open Free Clinic:** At a convention, held in Brooklyn in July, the Kings County Dental Society and eight other local dental societies planned to hold a three weeks' oral hygiene and health exhibit. The delegates represented more than 3,000 local dentists. It is purposed to show people why and how teeth should be taken care of, by means of huge models, graphic charts and lectures in language understandable to any man, woman or child. Motion pictures, free dental clinics and prizes for perfect teeth are to be part of this program. In addition to the exhibit, the delegates voted to establish a permanent free clinic at its headquarters in the old Astor Library Building, 425 Lafayette Avenue, Manhattan. Free treatment of the poor will begin in the fall.

**Illegal Public Welfare Organizations:** The New York Health Department, representing the state board of charities, and representatives of the commissioner of public welfare, are actively cooperating in putting a stop to activities of a large number of institutions organized to conduct day nurseries, homes for children, etc., which are not authorized by the city or the state to perform such work. There have been hearings concerning about fifty organizations, and the vast majority of these have been closed or ordered to discontinue activities until the necessary approval is given by the department of public welfare and the state board of charities, or the necessary permits secured from the department of health.—Journal of the American Medical Association, July 19, 1924.

**Dental College to Dissolve:** The College of Dental and Oral Surgery, founded in 1852, has applied to the supreme court for an order to dissolve the corporation. The property has been transferred to Columbia University and is being used by the medical department.—Journal of the American Medical Association, Aug. 9, 1924.

## FOREIGN

**Medical Degree for Dentists in France:** In a special communication received from the general secretary of the Association Francaise des Chirurgiene Dentistes, we are informed that a general meeting of the society, held in March 30, 1924, at the Faculty of Medicine of Paris, the members have expressed their conviction of the need of a new statute introducing the M.D. degree as an obligatory requirement for those intending to practice dentistry in France, and rejected the idea of the degree of Doctor of Dental Surgery as being a sufficient qualification. Having heard the addresses and reports of the work pursued, the results obtained, and the plans conceived, the Association Francaise des Chirurgiene Dentistes hold to their declaration of principles and express confidence that their Administrative Council will continue energetically their efforts for the accomplishment of this end.—Review of Clinical Stomatology, July, 1924.

**Organization of Dental Service in French Army:** Dr. Georges Villain, vice-president of the French National Dental Federation and director of the Dental School of Paris, explains, in the Military Dental Journal, the organization of the dental service in the French army, the composition of its personnel and its distribution in times of war. The military dental corps was established in February, 1916, with only the grade of sub-officer authorized. Shortly after the Armistice, the rank of commissioned dental officer was created. Only in case of mobilization is the organization to be complemented by military dentists of the reserve and of the territorial army. Dr. Villain summarizes the disadvantages in this scheme of organization as follows: 1. It is not effective in times of peace but only in times of war. 2. There does not exist a permanent organization of military dental surgeons as part of the active army proper, inasmuch as military dentists are not required to serve except in the active army reserve or in the territorial forces and then only during the period of mobilization. 3. There are only two grades

accessible to military dental officers. 4. The authorized maximum number of but 100 second class and twenty-five first class officers is quite insufficient to meet the demands of the service. 5. In all military formations the military dental officer is always subordinate to a military medical officer. 6. The dental service of the army is autonomous.

**Teeth and Health:** At the recent meeting at Wembley of the Ivory Cross League, a number of facts were mentioned to emphasize the close relation between the teeth and good general health. The Marquis of Salisbury said it was more than our modern diet that was responsible for the defects in our teeth, for civilization had produced over countless thousands of years a human jaw which was getting smaller. Unfortunately, Nature did not provide that the teeth should get smaller with the jaw, and they were now too crowded. Mr. W. F. Mellersh, Consulting Dentist to the Ivory Cross, declared that a toothbrush was not of the first importance, but if everyone would make regular use of floss silk, the national bill for dental attendances would be reduced to half. Moreover, if the teeth of everyone in these islands could be rated A1, the hospitals would be only half as crowded with ailments of all kinds, including cancer and tuberculosis. Dr. Noel Bardswell, of the London County Council Public Health Department, said that he had about 15,000 people on his books, and he was convinced that if greater care was taken of the teeth, the inroads of tuberculosis would be considerably less.—Dental Surgeon, August 2, 1924.

**Practice of Dentistry in Belgium:** The continual conflicts between dentists and graduate physicians with reference to the practice of dentistry have given rise to numerous discussions, and for several years the various professional societies have brought forward arguments for the introduction of some system of uniform regulation. At present, the profession of a dentist (a nongraduate physician) is subject to the decree of 1918, which recognized the post of dentist. The council for the betterment of higher instruction has brought the question up again and is now demanding additional guarantees before the title of dentist will be conferred. In keeping with this movement, the minister of arts and sciences has presented a bill which provides for the creation of a degree to be termed "licencie en sciences dentaires," or licentiate in dental science. A committee of the Royal Academy of Medicine has been appointed by the minister to inquire into and report on the resolutions passed by the aforementioned council. The committee has prepared a report, which will be discussed at a plenary assembly of the academy. The principal conclusions reached by the committee may be thus summed up: 1. A degree of doctor of dental science should be established. 2. The proposed law creating the degree of licentiate in dental science is hereby endorsed. 3. The committee approves the plan of examinations leading to that degree; namely: (a) The same training in the sciences and in the ordinary principles of medicine that is required of future doctors of medicine, surgery and obstetrics. (b) At least two years of special training, including the same courses in general pathology, pathologic anatomy, pharmacodynamics and pharmacology that is required of future physicians. The committee recommended that a resolution be adopted to the effect that it was desirable, at sometime in the future, that the practice of the art of dentistry be restricted to doctors of medicine, and that it would be unwise to create for doctors of medicine the degree of licentiate in dental science.—Belgium Letter, Journal of the American Medical Association, Aug. 2, 1924.

**Sheffield University's New Facilities:** The Dental School at the Sheffield University has been reorganized and fitted up with the most modern equipment in order to provide the necessary facilities for the teaching of dental mechanics and dental surgery. The whole of the work has been carried out under the supervision of Mr. G. H. Froggatt, lecturer in dental mechanics and surgery. At the Sheffield Royal Hospital, which is the University teaching centre, 134 patients were treated in 1913. In 1923, that number grew to 12,000 patients, and this year 6,000 have already received treatment.—Dental Record, August, 1924.

**Influence of Fish Diet on Teeth:** In his annual report, Dr. F. E. Gillieron, school dental officer for Cumberland, writes: "In examining Parton School children, I was particularly struck with the high percentage of those whose mouths were healthy and functioning, or who required very little treatment in order to make them so. On pursuing inquiries, I find that a large number of Parton men go fishing, either in small boats, or from the shore on which the small town is built. A lot of fish is caught and eaten by the people generally. It

seems to me reasonable to argue that this may have a very direct benefit on the teeth via the expectant mother. Fish is rich in lime and phosphorus, and all scientific stockbreeders are becoming very fully alive to the importance of providing rations to breeding-stock with more than a mere sufficiency of lime, and one certainly notices excellent teeth in districts with a chalk or limestone subsoil. More especially is this the case in chalky districts, as chalk is more highly soluble in rain-water than the limestone."—Dental Surgeon, August 2, 1924.

**Edinburgh Dental Hospital and School:** Reporting on the work of the year at the school, the Dean, Dr. William Guy, said the outstanding fact was the notable diminution in the number of students. This was due to two principal causes. The first was the completion of their courses of instruction by ex-service students, whose fees were paid under the scheme for the higher education of ex-service officers and men. The second was the coming into force of the new recommendations of the General Medical Council regarding the registration of dental students. The funds provided by the State for the higher education of ex-service students were exhausted and nearly all of the beneficiaries had now finished their course. The more stringent conditions governing the registration of dental students had temporarily arrested the flow of entrants to the study of dentistry, but when it was realized that the only avenue to practice was via the portals of a dental school and a licensing body, there would, he anticipated, be a large increase in the number of students. In this faith, plans had been prepared, and would be proceeded with immediately, for an extension of the hospital and school to accommodate two hundred students.—Dental Record, August, 1924.

**France and Unregistered Practitioners:** The climax of the campaign which has been carried on for some time past at Marseilles against the practice of dentistry by unqualified persons was reached recently when no fewer than twenty-nine local practitioners were found guilty by the police magistrates of practising without diplomas, or with aiding and abetting unqualified practitioners. Fines varying from 50 to 500 francs were inflicted. The local society of dentists and dental surgeons was awarded damages varying from 200 to 300 francs in each case. The defendants were also condemned jointly and severally to pay the costs of the proceedings, while the stocks of anesthetics found in their possession were confiscated.—Dental Record, August, 1924.

**Teeth and Insurance:** Three years ago, certain Approved Societies, lucky enough to possess a surplus, found themselves in a position enabling them to grant dental benefit under the National Insurance Act. The period covered has been long enough to constitute a reasonable test of the scheme, and the reports of the society make interesting reading. Applications from members who were desirous of obtaining additional benefit for dental treatment have been more common than any others. The money earmarked for this purpose has proved inadequate to the demands made on it, and additional sums have had to be diverted to it from funds which were not so much called upon. One society is credited with having spent no less than fifty thousand pounds on dental treatment. Statistics show that in general the money has been wisely expended. According to the return of another society over a period during which dental treatment was in practice, it was found that the incidence of sickness claims in ailments that usually have their origin in dental faults fell by 46 per cent.—Public Health (London), August, 1924.

**Leeds University Degree of M.Ch.D.:** At a meeting of the Court of the University of Leeds, a new ordinance was adopted for the degree of M.Ch.D., the important feature of which was that no candidate should be admitted to the degree of Master of Dental Surgery unless he had received the degree of Bachelor of Dental Surgery at least one year previously, and had also obtained a registrable qualification in medicine and surgery.—Dental Record, August, 1924.

## GENERAL

**The Outlook for Dentistry:** The key to the future of dentistry may be found in the records of the past and the outlook is very promising. True, there are many problems confronting us, but these will be faced fearlessly and their solutions sought after diligently. The outstanding need in dentistry is for men of broad education. Some think that our educational programme should be directed by the University; others, that it is best to arrange our own courses and acquire help as needed, from the University, with actual affiliation. To some the solution of our education problems seems to rest in an alliance with medi-

cine. It is a fact, however, that dentistry has already had such an experience and found separation advisable. The first dental colleges were organized because the medical schools would not recognize the needs of dentistry. Whether we make an alliance with the University, or medicine, or remain as we now are, we must ever have uppermost in our minds that necessity of developing the type of dentist to meet the newer demands. Our teachers must work with the firm determination that, in things educational, there is no substitute for honesty. The curriculum must include only those subjects that have a true bearing on dentistry, and every subject listed must be taught and taught well.—Thomas Cowling, in Oral Health, July, 1924.

**Government Tells How to Avoid Bad Investments:** 1. Mining Stock. The best looking mine in the world may prove a "white elephant." Mining is a very expensive undertaking and the risks are usually great. There is a saying that a mine "is a hole where fools dump their money." There are many good mining investments, of course, but this branch of the investment market is generally not for those who work for and depend upon a salary.

2. Oil Stock. Drilling for oil is costly. The hazards are great. Oil investments are speculative and in a class with mining investments.

3. In the wake of every important discovery or invention there comes a host of schemes—"airplanes," "radio," "wireless." The promoters of these may have only the best of intentions, but frequently their enthusiasm is about all they have to sell. Look before you leap.

4. Investments in "real estate" situated in some distant place are sometimes as dangerous as mining stock. People have been known to buy swamps advertised as "sea-shore frontage." Know what you are buying before you invest.

5. "Land development" schemes frequently do not pan out. At best it is a long time before any money comes in from sales. Investment in "new companies" that are going to "sell by mail" should be generally avoided.

6. Patent rights and processes distribution. It is rarely the patentee who makes the money.

7. "New Manufacturing Methods" should always be closely checked and investigated.

8. An investment requiring a quick decision is often a fake. If there isn't sufficient time to "sleep over it," something is probably wrong.

9. "Special inducements" in cash discounts or stock bonuses urging you to be one of the first to invest are suspicious symptoms.

10. "Tips" alleged to land you "on the ground floor" are rarely to be taken. Those who are "on the ground floor" will monopolize the opportunity.

11. "Playing the stock market on margin" and all other forms of speculation are decidedly not for the small investor. Beware of the "bucket shop." If you buy stocks outright for investment do so through a member of a legitimate exchange.

12. Stock in "mail order companies" being organized with promises based on what others have done rarely turn out well."—Associated Advertising, July, 1924.

**Dental and Facial Deformities and Chest Development:** D'alise found a lower vital capacity of the lungs in children with deficient articulation of teeth. He believes that breast nursing is a factor in the normal development of the face and oral cavity. The present tendencies in physical education overlook the head, though it ought to be regarded as the most important part of the body. Besides this, the production of athletes entails an unbalanced, one-sided development which is in itself pathologic.—Riforma Medica (abstr. J.A.M.A.), July 5, 1924.

**Cancer Mortality:** Cancer was the fifth cause of death in numerical importance, according to a monograph just completed by the Metropolitan Life Insurance Company relating to the mortality from cancer among its millions of industrial policy holders; it being outranked only by heart disease, tuberculosis, chronic interstitial nephritis (Bright's disease) and pneumonia. Cancer of the buccal cavity was responsible for 8.9 per cent of all cancers among white males and 6.9 among colored males. Only 1 per cent of deaths from cancers among females was due to buccal cavity growths. The death rates run higher among white than among colored men, but with women the situation is reversed. The trend of the death rate was downward between 1911 and 1922 except for colored males. Most of the deaths result from growths of the tongue and jaw.

**Influx of Foreign Physicians:** Some weeks ago, it was pointed out that there has been an influx of foreign physicians into the United States and that this was

undesirable in many cases. The following states have taken action to require application for naturalization papers, actual citizenship, or an examination written in English, before a foreign physician can be licensed: Arizona, Florida, Illinois, Indiana, Louisiana, Maryland, Michigan, Nebraska, New Hampshire, New York, Oklahoma, Pennsylvania and Texas.—Time, July 21, 1924.

**Dr. Brophy Officer of Legion of Honor:** Dr. Truman W. Brophy of Chicago was made an officer of the Legion of Honor, August 1. The decoration was conferred in Quai d'Orsay by M. Renault, acting for the minister of war. Dr. Brophy's decoration is unusual, as officers of the Legion of Honor generally are named from the ranks of chevaliers, but he has never been a chevalier. Both honors were given at the same time. As president of the International Dental Federation, Dr. Brophy will be president of the Societe Federation's convention in Luxemburg.

**Pamphlets on Mouth Hygiene Distributed:** The dental department of the Metropolitan Life Insurance Company has distributed nearly five million copes of a popular "flyer" for lay people entitled "Peep into the Future, or "Care of the Teeth." About four million and a half were printed in English, while half a million were in French, Italian, Polish, Yiddish and Spanish.

**Periodic Medical Examinations:** Health examination, health guidance, longevity service or personal preventive medicine is receiving more and more attention by the medical profession through the state and county medical societies (Journal of the American Medical Association, Aug. 2, 1924). A study of the findings of one society, ninety-one members of which were examined, discloses almost every deviation from normal to be expected in a group presumably healthy, although comparison with other series of examinations by the United States Public Health Service, and by insurance companies, indicates that the physicians rate better in "health" than other corresponding age groups. Whether this is due to the infrequency of bad mouth conditions and constipation in the list of "defects" found is a natural question. Contrary to the usual experience, hypotension was frequent. Physicians, knowing blood pressure apparatus and technic, are not nervous. That physicians, despite irregular hours of work, deviation from routine as to meals and sleep, and less systematic exercise and recreation than is usually considered advisable, rate so high in health would seem to indicate that subconsciously, at least, physicians practice what they preach.

**The Predental Year:** It would appear that before any further additions are made to the preliminary requirements, or to the professional course of instruction, in fairness to all, some idea should first be obtained of the results of training dental students by the methods in operation. If the product of the dental schools which have been operating under the four-year course, with the preliminary requirement of high school education and without a preparatory college year, does not come up to the desired standards of efficiency, then a close survey of the situation should be carried out, and such changes and additions introduced into the preparatory education and possibly into the professional curriculum as will provide a more skilled type of dental graduate. The demand on the part of educators for college preparatory years should be based strictly upon the needs of dental education.—L. E. Ford, in Pacific Dental Gazette, July, 1924.

**Death of Dr. Sippy:** Dr. Bertram W. Sippy of Chicago, stomach specialist and noted among physicians for the Sippy treatment of stomach ulcers, dropped dead at his summer residence near Ludington, Mich., August 15. Dr. Sippy, who was 57 years old, had been suffering from diabetes for several months.

**Army Dental School Graduation:** The graduation exercises of the Army Dental School were held Friday, June 6, in the Formal Garden at the Army Medical Center, Washington, D. C. Eleven graduates received their diplomas, presented by Secretary of War Weeks.

**Naval Dental School Graduation:** Graduation exercises which marked the completion of the third course of the Naval Dental School were held, May 29, in the auditorium of the Naval Medical School. Certificates were awarded to all of the dental officers who had successfully completed the courses. Those officers of the Dental Corps receiving certificates were: Lieutenants Ralph B. Putnam, Frederick M. Ingersoll, Jesse W. Miller, Francis R. Hittinger and Hugh E. Mauldin.

**Acceptance of Reappointment in the Dental Officers' Reserve Corps:** Reports from the office of the Surgeon General of the Army, indicate that a considerable number of Dental Reserve Officers have failed to accept reappointment of Com-

mission. Members of the Dental Officers' Reserve Corps are advised that all appointments in the Reserve Corps are for a period of five years as provided by law. Notice of reappointment and oath of office is sent to Reserve Officers whose commissions are about to expire, sufficiently in advance of the expiration date to permit acceptance and make the appointments continuous. Failure to accept before expiration date automatically separates the officer from the Reserve Corps, and reinstatement can be accomplished only through the formality of application as for original appointment. It is probable that failure to accept is due to misinterpretation of the promotion regulations published in this Journal in December, 1923, which provide for promotion after each five-year period. Reserve officers are advised that these promotions are not made automatically. If Reserve Officers desire promotion upon reappointment, they must apply for promotion through the Corps Commander of the area in which they reside, sufficiently in advance of expiration of appointment (about sixty days) so that reappointment may be possible in a higher grade. Officers who are offered reappointment, but who desire higher grade, should accept reappointment in the grade offered and at once apply for promotion. Cooperation on the part of the Reserve Officers in promptly accepting reappointment will aid in promoting the progress of the Reserve organization.—Military Dental Journal, June, 1924.

**Nitrous Oxid-Oxygen Analgesia:** Analgesia is indicated: (1) Where intense or prolonged pain is expected. (2) Where a number of cavities present, the preparation of which will be a distinct shock to the nervous system of the patient. (3) Where it is desired to complete the work as speedily as possible, as for instance in the extremely apprehensive patient to whom one visit to the dentist is a purgatory in anticipation and each succeeding visit worse, thus producing a distinct dental shock. Contraindications for the use of analgesia in dentistry may be taken as the opposite of the above. In so far as the physical condition of the patient is concerned, the contraindications are few. The great advantages of analgesia for cavity preparation are obviating dental shock and eliminating the fear of the dental engine; and the experience is generally so pleasant that, instead of the patient looking forward with dread to approaching visits to the dentist, the anticipation is one of equanimity. There are some disadvantages, among which may be mentioned: (1) It is always necessary to have an assistant or dental nurse in attendance. (2) The patient can give less cooperation than without it, but this is largely compensated by the absence of recoil from pain in the patient, with a consequent interruption of work. (3) It is also more difficult to operate with the nose-piece in place, especially if operating on labiogingival cavities in the maxillary anterior teeth. There are some necessities for success: (1) A proper machine and a nose-piece which does not intrude too greatly on the field of operation. (2) Familiarity with the minute regulations of the mechanical appliance. (3) Familiarity with the fundamental principles of producing analgesia. (4) Knowledge as to how to introduce analgesia to new patients, and ability to obtain their complete confidence. (5) A knowledge of suggestive therapeutics. (6) And a most intimate knowledge of the minute dental anatomy. — Anesthesia and Analgesia, August, 1924.

**Classification of U. S. Marine Hospitals:** The Surgeon General, U. S. Public Health Service, has requested the American College of Surgeons to inspect the Marine Hospitals under his control, twenty-five in number, to the end that these institutions may, if found qualified, be placed on the approved list of hospitals published by that organization.

**Procain in Regional Anesthesia:** Dr. M. E. Blahd (Journal of the American Medical Association, Aug. 9, 1924) says: I cannot refrain from pointing out the danger of injecting procain solution within the lumen of a blood vessel. Procain, when properly used, is practically nontoxic; but when injected into the circulation, it becomes extremely toxic and may cause sudden and quick death. If just two points are remembered, the accident of injecting procain into the vascular stream will never happen: 1. Whenever possible, one should keep the needle in continuous motion while injecting. 2. If it is necessary to inject with the needle in a stationary position, as in the case of an anterior splanchnic anesthesia, one should aspirate for blood before each syringeful is injected. These two points cannot be emphasized too strongly, as it is my opinion that all procain deaths are due to the presence of procain in the blood stream. I have always observed these two points with the utmost care, and up to the present

time have not seen a single case of procain poisoning, in spite of the fact that I have used as much as 250 c.c. of 0.5 per cent procain solution at a single operation.

**The Flag:** A national flag conference was held in Washington sometime ago. It was called by the American Legion. It adopted a code which it is hoped will come generally into civilian practice. In display of the flag, as by this code, the following are fifteen things to avoid:

1. Do not dip the flag of the United States to any person or any thing. The regimental color, State flag, organization or institutional flag, will render this honor. At sea the flag may be dipped in acknowledgment of the salute of the flag of another nation.
2. Do not display the flag of the United States with the Union down except as a signal of distress.
3. Do not place any other flag or pennant above or to the right of the flag of the United States.
4. Do not let the flag of the United States touch the ground or trail in the water.
5. Do not place any object or emblem of any kind on or above the flag of the United States.
6. Do not use the flag as drapery; use bunting.
7. Do not fasten the flag in such manner as will permit it to be easily torn.
8. Do not drape the flag over the hood, top or sides of a vehicle or of a railroad train or boats. If it is desired to display the flag on a motor car affix the staff firmly to the chassis or clamp it to the radiator cap.
9. Do not use the flag to cover a speaker's desk or to drape over front of a platform or over chairs or benches.
10. Do not display the flag on a float in a parade except on a staff.
11. Do not use the flag as a ceiling covering.
12. Do not use the flag of the United States as a portion of a costume or of an athletic uniform. Do not embroider it upon cushions or handkerchiefs or print it on paper napkins or boxes.
13. Do not put lettering upon the flag.
14. Do not use the flag of the United States in any form of advertising nor fasten an advertising sign to a flag pole.
15. Do not display, use or store the flag in such a manner as will permit it to be easily soiled or damaged.

A suggestion that the proper salute to the flag by a woman be the military salute employed by soldiers in uniform was amended to read that her right hand should be placed over her heart in paying respect to the emblem.

**Publicity and Education:** The success of any public health procedure depends largely on sound organization—with sufficient powers and personnel. A properly organized division of Child Hygiene in a State Department of Health can stimulate the local community and will tap the resources in the national field.

The facilities for suitable publicity and education are of vital importance. The objective of our publicity should be to build up an informed public opinion which will support a well rounded program of child hygiene. This program must contain ample provision for the education of the individual. Our educational matter must be of proper character and our personnel must understand the principles of teaching. Too often we mistake public health information for education.—American Journal of Public Health.

## ARMY

**Dental Corps:** Captain Jerome L. Fritsche will report to retiring board, Fitzsimons General Hospital, for examination.—Army and Navy Register, July 19, 1924.

Colonel John H. Hess having been found by an Army retiring board incapacitated for active service on account of disability incident thereto, his retirement from active service is announced; proceed home.—Army and Navy Register, August 2, 1924.

Captain John N. White from duty at medical field service school, Carlisle Barracks, Pa., to Fort Williams, Me., for duty.—Army and Navy Register, August 16, 1924.

SIXTY-SIXTH ANNUAL SESSION OF THE AMERICAN DENTAL ASSOCIATION
DALLAS, TEXAS, NOVEMBER 10-14, 1924

# PRELIMINARY PROGRAM FOR DALLAS SESSION

## FIRST GENERAL SESSION

**(General Assembly Hall, Convention and Exhibit Building)**

**TUESDAY MORNING, NOVEMBER 11—9:40 O'CLOCK**

Recital .....9:40-10:00
By Orchestra Dallas County Dental Society

Invocation
By Bishop Harry T. Moore of the Episcopal Church, Dallas, Texas.

Vocal Selection
By Mrs. Albert T. Smith.....Dallas, Texas

Address of Welcome on Behalf of the State of Texas
By Governor Pat M. Neff

Address of Welcome on Behalf of the City of Dallas
By Mayor L. Blaylock

Address of Welcome on Behalf of the Dallas Chamber of Commerce
By T. M. McCullum, President

Address of Welcome on Behalf of Baylor University
By S. P. Brooks, President

Address of Welcome on Behalf of the Texas State Dental Society
By W. O. Talbot, President

Address of Welcome on Behalf of the Dental Profession of Dallas and Presentation of Gavel to President Giffen on Behalf of the Local Committee on Arrangements
By Dr. Bush Jones

Response to Addresses of Welcome
By J. F. Biddle .....Pittsburgh, Pa.

Introduction of Distinguished Visitors

President's Address
By William A. Giffen .....Detroit, Mich.

Exit March

## THE SCIENTIFIC SECTIONS

### OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS

(Section Hall No. 3, Convention and Exhibit Building. All subsequent meetings held in the same place.)

OFFICERS OF SECTION

E. C. Mills, Chairman .....Columbus, Ohio
Alfred P. Lee, Vice-Chairman .....
.....Philadelphia, Pa.
M. M. Printz, Secretary .....Chicago, Ill.

### TUESDAY AFTERNOON, NOVEMBER 11

2 to 5 o'clock

"High Lights on Porcelain"
By Hugh Avary ..... San Francisco, Calif.
Discussed by
Albert Leland LeGro .....Detroit, Mich.
W. T. Reeves .....Los Angeles, Calif.

"Bone and Its Regeneration"
By John P. Buckley .....Hollywood, Calif.
Discussed by
Edward H. Hatton .....Chicago, Ill.
F. B. Moorehead .....Chicago, Ill.

"A Revised Operative Procedure from Cavity Preparation to the Finished Casting"
By L. C. Burgard .....Louisville, Ky.
Discussed by
L. L. Barber .....Toledo, Ohio
T. W. Mavis .....Minneapolis, Minn.
K. W. Knapp .....Minneapolis, Minn.

### WEDNESDAY MORNING, NOVEMBER 12

9 to 12 o'clock

"The Dentist's Health; How to Preserve It"
By E. H. Cary (M.D.) ....Dallas, Texas
Discussed by
Thomas B. Hartzell ....Minneapolis, Minn.
Thomas P. Hinman .....Atlanta Ga.

"Incisal Retention vs. Lingual Retention"
By W. R. Clack .....Mason City, Iowa

Discussed by
G. A. Crise .....Manhattan, Kan.
F. W. Schaefer .....Omaha, Nebr.
H. B. Tileston .....Louisville, Ky.

"Orthodontia: Factors Making It Necessary That May Be Partially Eliminated"
By Martin Dewey .....New York City

Discussed by
Hugh G. Tanzey .....Kansas City, Mo.
Frank M. Casto .....Cleveland, Ohio

## WEDNESDAY AFTERNOON, NOVEMBER 12

2 to 5 o'clock

"The Child's Mouth"
By Haidee Weeks Gutherie .....
.....New Orleans, La.

Discussed by
Gillette Hayden .....Columbus, Ohio
Philip R. Thomas .....Minneapolis, Minn.

"Limitations of the Roentgen Ray in Dental Practice"
By C. Edmund Kells .....New Orleans, La.

Discussed by
Clarence O. Simpson .....St. Louis, Mo.
Howard R. Raper ....Albuquerque, N. M.

"Further Study of Casting Problems"
By K. W. Knapp .....Minneapolis, Minn.

Discussed by
J. M. Prime .....Omaha, Nebr.
R. H. Volland .....Iowa City, Iowa

## THURSDAY MORNING, NOVEMBER 13

9 to 12 o'clock

"The Immunization of Bicuspids and Molars by the Use of Gold Foil"
By J. Mark Prime .....Omaha, Nebr.

Discussed by
Robert E. Blackwell .....Chicago, Ill.
J. V. Conzett .....Dubuque, Iowa
H. E. Friesell .....Pittsburgh, Pa.

"A General Consideration of Root Canal Therapy"
By Emerson R. Sausser ....Philadelphia, Pa.

Discussed by
E. D. Coolidge .....Chicago, Ill.
Edouard M. Hall .....Kansas City, Mo.

"The Place of Amalgam in Dentistry"
By Wilbert J. Scruton .....
.....Oklahoma City, Okla.

Discussed by
J. J. Clarke .....Artesia, N. M.
William E. Harper .....Chicago, Ill.
J. D. Patterson .....Kansas City, Mo.

## FULL DENTURE PROSTHESIS

(Section Hall No. 4, Convention and Exhibit Building. All subsequent meetings will be held in the same place.)

OFFICERS OF SECTION

I. Lester Furnas, Chairman ....Cleveland, Ohio
Victor H. Sears, Vice-Chairman .....
.....Salt Lake City, Utah
E. H. Bruening, Secretary .....Omaha, Nebr.

## TUESDAY AFTERNOON, NOVEMBER 11

2 to 5 o'clock

"Surgical Preparation of Mouths for Dentures"
By J. A. Blue .....Birmingham, Ala.

Discussed by
Ewell Neil .....Memphis, Tenn.
J. A. Heidbrink .....Minneapolis, Minn.

"The Value of the Radiograph in Edentulous Mouths"
By F. F. Molt .....Chicago, Ill.

Discussed by
E. W. Browning .....Salt Lake City, Utah
Earl H. Thomas .....Chicago, Ill.

## WEDNESDAY MORNING, NOVEMBER 12

9 to 12 o'clock

"Simple Technic to Obtain Maximum Retention and Stability in Lower Impressions"
By F. M. Hight .....Houston, Texas

Discussed by
B. L. McCoy .....Dallas, Texas
A. E. Kruse .....Houston, Texas

"Simple Technic to Obtain Maximum Retention and Stability in Upper Impressions"
By C. J. Stansberry .....Seattle, Wash.

Discussed by
Walter E. Mendell .....Pittsburgh, Pa.
V. C. Smedley .....Denver, Colo.

## WEDNESDAY AFTERNOON, NOVEMBER 12

2 to 5 o'clock

"Some New Phases of Dentistry"
By Dayton Dunbar Campbell .....Kansas City, Mo.

Discussed by
P. C. Lowery .....Detroit, Mich.
E. H. Bruening .....Omaha, Nebr.

"Practical Application of Technic"
By Charles Lane .....Detroit, Mich.

Discussed by
J. B. LaDue .....Chicago, Ill.

## THURSDAY MORNING, NOVEMBER 13

9 to 12 o'clock

"New and Original Research in the Kinematics of the Mandible"
By Marcelino Weiss .....Havana, Cuba

"Value of and Practical Methods of Obtaining Central Occlusion"
By Rupert E. Hall .....Chicago, Ill.

Discussed by
R. R. Gillis .....Hammond, Ind.
M. M. House .....Kansas City, Mo.

## PARTIAL DENTURE PROSTHESIS

(Section Hall No. 5, Convention and Exhibit Building. All subsequent meetings held in the same place.)

OFFICERS OF SECTION

Willis A. Coston, Chairman....Topeka, Kan.
Emory C. Thompson, Vice-Chairman .....Warren, Pa.
O. DeForest Davis, Secretary, .....Minneapolis, Minn.

## TUESDAY AFTERNOON, NOVEMBER 11

2 to 5 o'clock

"The Necessity of Occlusal Balance in Partial Denture Construction"
By G. E. Cleophas .....Beloit, Wis.

*Synopsis*—We must consider the dental apparatus as a whole and the distribution of functional forces through occlusion as our basis for all diagnosis and treatment. Too much attention has been given to technic and the mechanics of the appliance alone, fundamentals that must be applied and maintained, if the most artistic dental restoration is not to be a failure, being ignored.

"Dental Radiography as Related to the Partial Denture Prosthetist"
By E. W. Browning .....Salt Lake City, Utah

*Synopsis*—A plea for complete denture roentgenograms no matter how large or small the contemplated restoration. The cause for failure of many restorations lies not in the faulty technic of the operator but in faulty and incomplete roentgenograms. Lantern slides will show bone conditions that are unfavorable for the retention of any kind of restoration.

## WEDNESDAY MORNING, NOVEMBER 12

9 to 12 o'clock

"Metallography of Precious Metal Alloys Used in Dentistry"
By J. S. Shell .....San Francisco, Calif.

*Synopsis*—A study of the internal structure of metals by means of the metallurgic microscope which is now extending its application to most of the industries using metals. It has been applied to the alloys used in dentistry, and this paper deals with the fundamental conceptions upon which the science of metallography is founded, as well as some original work in the dental field.

"A New and Simplified Method of Partial Denture Construction"
By Polk E. Akers .....Chicago, Ill.

*Synopsis*—Complete casting in one piece from patterns on original models: (*a*) for all metal construction; (*b*) for vulcanite attachments. 1. Preparation of abutment teeth. 2. Impressions and new impression material; preparation and trimming of impression. 3. Investments: Method in mixing and new investment materials. 4. Preparation of models for wax patterns. 5. Waxing and trimming. 6. Investing and burning out. 7. Casting technic. 8. Finishing and fitting constructed cases; prevention of undue strain on abutment teeth or tissues. Instruction to patients for care of replacements.

## WEDNESDAY AFTERNOON, NOVEMBER 12

2 to 5 o'clock

"A Review of Literature on the Eustachian Tube, with Data Indicating a Relation to the Dental Occlusion"
By Tom Smith .....Langdon, N. D.

*Synopsis*—1. The function, anatomy and physiology of the eustachian tube. 2. The relation of the pharynx and middle ear and mastoid cells to the eustachian tube. 3. The

intimate relation of the muscles of the soft palate to the eustachian tube. 4. Pathologic conditions of the eustachian tube and their influence on the organ of hearing. 5. Defects of hearing due to affections of the middle ear and eustachian tube. 6. The effect of closed bite on the function of the eustachian tube. 7. Case histories and data.

"Coordination of the Various Factors Entering into Partial Denture Construction"
By Walter F. Chappell .....Buffalo, N. Y.

*Synopsis*—The use of clasps, rests, indirect supports and stress breakers. Consideration of saddle area and its relation to articulation. Subsequent care of mouth and restorations.

## THURSDAY MORNING, NOVEMBER 13

9 to 12 o'clock

"Partial Denture Construction Eliminating Gingival Irritation"
By Charles A. Furrow .....Tulsa, Okla.

*Synopsis*—The necessity of resorting to partial dentures today, through the extensive mutilation of mouths, has brought us face to face with many problems and much too frequently very unsatisfactory results. One of the outstanding results is the lack of tissue health in the form of gingival irritation and resorption adjacent to attachment teeth.

"Advantages and Practical Application of Removable Bridgework"
By J. J. Moffitt .....Harrisburg, Pa.

*Synopsis*—1. Necessity of restoring lost teeth. 2. Fixed bridges and partial dentures. 3. Conditions calling for removable bridges. 4. Some advantages of removable bridgework. Preservation of hygienic oral conditions. Distribution of stress of mastication. Restoration of anatomic conditions of oral cavity. Ease of repairing. 5. Two part removable bridges and other new developments in the attachments and construction.

## ORAL SURGERY, EXODONTIA AND ANESTHESIA

(General Assembly Hall, Convention and Exhibit Building. All subsequent meetings held in the same place.)

OFFICERS OF SECTION

Boyd S. Gardner, Chairman ..Rochester, Minn.
Frederick F. Molt, Vice-Chairman .....Chicago, Ill.
J. A. Blue, Secretary .....Birmingham, Ala.

## TUESDAY AFTERNOON, NOVEMBER 11

2 to 5 o'clock

"Focal Infection"
By Charles H. Mayo (M.D.) .....Rochester, Minn.

"Important Considerations in the Diagnosis of Surgical Oral Lesions"
By Theodor Blum ..... ....New York City

## WEDNESDAY MORNING, NOVEMBER 12

9 to 12 o'clock

"Fundamentals Suggested by Recent Researches for Diagnosis, Prognosis and Treatment of Dental Focal Infections"
By Weston A. Price .....Cleveland, Ohio

## WEDNESDAY AFTERNOON, NOVEMBER 12

2 to 5 o'clock

"Designs of Operations"
By William L. Shearer .....Omaha, Nebr.

"Differential Diagnosis of Oral Lesions"
By Chalmers J. Lyons ....Ann Arbor, Mich.

## THURSDAY MORNING, NOVEMBER 13

9 to 12 o'clock

"Ethylene-Oxygen Anesthesia in Dentistry"
By John F. Christiansen ....Chicago, Ill.

*Synopsis*—The most potent single factor in determining the usefulness of an anesthetic gas is its effect on the oxygenation of the tissues of the body. The requirements of an ideal anesthetic gas are several, some concerned with the period of induction, some with the recovery of the patient and others with the effect on the oxygenation of the tissues. Ethylene meets most of the requirements in the average case. Ethylene has been used successfully in dental operations when a proper technic has been employed.

"Actinomycosis"
By Gordon B. New (M.D.) .....Rochester, Minn.

"Dental Radiography"
By Frederick F. Molt .....Chicago, Ill.

## ORTHODONTIA AND PERIODONTIA

(Section Hall No. 1, Convention and Exhibit Building. All subsequent meetings held in the same place.)

OFFICERS OF SECTION

William C. Fisher, Chairman....New York City

Olin Kirkland, Vice-Chairman .....Montgomery, Ala.

B. Frank Gray, Secretary .....San Francisco, Calif.

### TUESDAY AFTERNOON, NOVEMBER 11

2 to 5 o'clock

"Diet and Its Relation to Periodontal Disturbances"
By E. A. Hennen .....Wheeling, W. Va.

"Trophic Changes in the Osseous Structures of the Palate and the Alveolar Process in Tuberculosis"
By C. S. Kramer .....Woodman, Colo.

*Synopsis*—Brief history of tuberculosis; pulmonary tuberculosis, the most common form of the disease in man. Tubercle baccilli from sputum from the mouth and lungs; culture, tuberculosis in soft tissues, lungs and larynx; ulcers of gums and tongue, cervical and submental glands; hypertrophic osteo-arthropathy of fingers, toes, gums, hard palate and alveolar processes. (Slides.) Percentage of this condition and type of cases in which it occurs.

"Correction of Cusp Antagonism of the Natural Teeth"
By A. K. Parks .....Montgomery, Ala.

### WEDNESDAY MORNING, NOVEMBER 12

9 to 12 o'clock

"The Application of Biologic Principles to the Practice of Periodontia"
By Benjamin Tishler .....Boston, Mass.

*Synopsis*—We should no longer ignore the biologic factors that control the metabolism of bodily tissues, and we should use the cell as a basis in the practice of our profession, rather than the tissues, as we have in the past. Some practical facts will be correlated, with this idea in view, in order to emphasize its importance.

"The Sequelae of Traumatic Occlusion"
By W. H. Scherer .....Houston, Texas

*Synopsis*—Trauma is an injury to a tissue produced by mechanical injurious agents. Traumatic occlusion will cause a condensing osteitis or a breaking down of the supporting tissues in frail alveolar structures. Numerous manifestations of traumatic occlusion are found, pulpitis, recession of the marginal gingiva and tenderness of the gingival tissue. The prevalence of occlusal trauma is greater than is usually supposed. It is not limited to its association with periodontoclasia, as it may exist for some time before it is apparent.

"Eradication of Pyorrhea Pockets and Post-operative Packing"
By A. W. Ward .....San Francisco, Calif.

### WEDNESDAY AFTERNOON, NOVEMBER 12

2 to 5 o'clock

Address by Chairman of the Section
By W. C. Fisher .....New York City

"The Question of Speed in Orthodontic Treatment"
By James D. McCoy ....Los Angeles, Calif.

*Synopsis*—The length of time that should be required for the correction of commonly occurring types of malocclusion is, at present, a subject of debate among orthodontists. Any satisfactory solution of the problem must be settled on a correct conception of what is entailed in treatment and what must be accomplished by it. The mere mechanical movement of teeth into correct occlusal relations is but one step toward the goal of success, for other factors of equal importance must be considered. Controversies emanating from the exponents of various types of orthodontic appliances have done much to becloud the real issues at stake and have created false and harmful impressions, derogatory to the progress of orthodontia.

"A Consideration of the Correct Time for Orthodontic Treatment"
By Charles R. Baker .....Evanston, Ill.

*Synopsis*—Patients should receive early orthodontic treatment, with the idea of assisting the teeth and all correlated tissues to develop to the normal and afford the maximum functional efficiency for the individual. Naturally, there are exceptions to this rule, which will also be discussed.

### THURSDAY MORNING, NOVEMBER 13

9 to 12 o'clock

"The Orthodontic Sphere"
By Oscar E. Busby .....Dallas, Texas

*Synopsis*—The correction of malocclusion of the teeth is merely an incident in the orthodontic sphere. The teeth serve as points of anchorage in directing the growth and development of the entire organism; especially those

structures that compose the head and the face; therefore, there will be discussed some of the biologic subjects relating to growth and development, taking into consideration some of the histologic elements, anatomic structures and morphologic changes during orthodontic procedure.

"Reasons for the Existence of an Orthodontic Specialty"
By T. G. Duckworth ..San Antonio, Texas

"Orthodontic Treatment as Related to the Growth of the Face"
By W. E. Flesher ....Oklahoma City, Okla.

*Synopsis*—The normal changes in the facial lines during growth from infancy to adult life. The facial lines as influenced by the malposition of the teeth. Growth of the face toward the normal in normal occlusion. Progressive growth toward the abnormal in malocclusion. Lack of evidence of incipient stages of malocclusion in the face. The necessity of early recognition and treatment of malocclusion to avoid facial deformities. Lack of assurance that treatment, when delayed, will restore the facial lines to normal, one of the ends sought in orthodontic treatment.

## MOUTH HYGIENE AND PREVENTIVE DENTISTRY

(Section Hall No. 7, Convention and Exhibit Building. All subsequent meetings held in same place.)

OFFICERS OF SECTION

Thomas B. McCrum, Chairman .....Kansas City, Mo.

C. J. Hollister, Vice-Chairman .....Harrisburg, Pa.

R. S. Towne, Secretary .....Bismarck, N. D.

## TUESDAY AFTERNOON, NOVEMBER 11

2 to 5 o'clock

"Our Profession's Obligation to the Factory Worker (Illustrated)."
By E. L. Pettibone .....Cleveland, Ohio

*Synopsis*—The obligation of each member of the dental profession to the workers of his community will be emphasized. The value of the plant dental dispensary from an educational and economic standpoint will be pointed out, attention being called to its value as an agency for providing dental service for "the other 80 per cent."

Discussed by
G. T. Epling .....Welch, W. Va.
Guy S. Millberry ....San Francisco, Calif.

"The Dental Hygienist as a Factor in Public Education"
By W. O. Talbot .....Fort Worth, Texas

*Synopsis*—Public education should deal with mental, moral and physical development and care. Relation of the physical to the mental and moral being is emphasized. Factors which produce physical well being are proper food, clothing, exercise and hygiene. The last adds to comfort and prevents disease. This is especially applicable to the mouth. The dental hygienist has evolved from the dental prophylactician.

"The Dental Hygienist in the Office of the General Practitioner"
By Mary S. Newbury ....Cleveland, Ohio

*Synopsis*—How the hygienist instructs the patients in the care of the mouth and how the mothers and children are given advice about their diet will be detailed, and it will be shown why the hygienist is a particularly important factor in bringing the coming generation to the realization of the value of mouth hygiene.

"Essentials in Dental Health Education" (Illustrated)
By Evelyn C. Schmidt .....Chicago, Ill.

*Synopsis*—Dental health education must have dental leadership. Authorities must agree on certain simple, fundamental facts concerning mouth hygiene and preventive dentistry. These may be developed and enlarged upon according to the group to be reached. Methods are suggested and psychologic factors presented. Illustrative material will be used.

Discussed by
R. S. Towne .....Bismarck, N. D.
Thomas B. McCrum .....Kansas City, Mo.

## WEDNESDAY MORNING, NOVEMBER 12

9 to 12 o'clock

"Preventive Dentistry for Children"
By F. Blaine Rhobotham ....Chicago, Ill.

Discussed by
L. W. Helm .....Waco, Texas
Stella Risser .....Houston, Texas

"The Maintenance of Spaces After Extraction of Deciduous Teeth" (Illustrated)
By Philip R. Thomas....Minneapolis, Minn.

"Health Habits Good and Bad"
By M. Evangeline Jordan .....Los Angeles, Calif.

*Synopsis*—Food and eating habits, good and bad; hygiene, good and bad; posture, good and bad, in walking, sitting and sleeping; good and bad methods in discipline.

## WEDNESDAY AFTERNOON, NOVEMBER 12

2 to 5 o'clock

"The Detroit Plan of Dental Service" (Illustrated)
By A. G. Thompson .....Detroit, Mich.

"Evolution of Rural Clinics in Virginia" (Illustrated)
By N. Talley Ballou .....Richmond, Va.

*Synopsis*—The beginning: Law creating child welfare department, requiring all public school teachers to take a course in physical inspection. Results of inspection, showing dental needs. Survey showing scarcity of dentists in rural sections. Financial plan. Report of work accomplished. Supplementary work, preschool and maternity.

"Mouth Hygiene in Mississippi"
By Bowden Hudson .....Jackson, Miss.

*Synopsis*—The organization of mouth hygiene in Mississippi will be presented, and the objectives toward which the hygienists are working. The program by which it is hoped to reach these objectives, the agencies cooperating and the teaching devices used in carrying out the program will also be presented.

"Dental Public Health Administration"
By Harold DeW. Cross ....Boston, Mass.

*Synopsis*—Public health service has only recently begun to give attention, relatively speaking, to matters of health not dealing with the immediate preservation of human life, with practically no definite attempt to control or prevent the serious condition of children's teeth, especially by health authorities. Far from advocating any treatment for advanced tooth disease, it is suggested that the prevention of them is a suitable public health procedure. One reason why health authorities do little along lines of preventive dentistry is because of a lack of training, knowledge and experience by dentists in this relatively new field. There is now enough knowledge as to the methods and policies needed to produce results in dental public health work, so that no community or health department need wait for more information. It is only a question of getting at this knowledge and a willingness to put into operation the essential policies.

## THURSDAY MORNING, NOVEMBER 13

9 to 12 o'clock

"The Practical Application of Diet and Nutrition to Dental Practice"
By Wallace Seccombe ....Toronto, Canada

*Synopsis*—Much has been said and written about diet in relation to dental disease, and the dental profession generally has shown a widespread and keen interest in the problem. There has, however, been a disposition to treat the subject in a more or less academic way, without practical applications being made to the actual conduct of a dental practice. An endeavor will be made, in this presentation, to develop such a simplified standardization by means of diet charts and food tables as shall enable the general dental practitioner to make an intelligent study of a case leading to scientifically based conclusions and resulting in the practical application of fundamental preventive principles to dental practice.

Discussed by
Percy R. Howe .....Boston, Mass.

"A Seventeen Year Experiment in Diet and Hygiene in a Children's Home"
By Trim Houston .....Corsicana, Texas

Discussed by
Willis A. Coston .....Kansas City, Mo.

"Chalk Talk on Diet and Teeth"
By Lucille Philbrook ....Philadelphia, Pa.

"Education of the Public in General Dentistry"
By C. D. Fowlkes .....Birmingham, Ala.

*Synopsis*—Urgent need, as a preventive measure, that a series of articles covering every phase of the subject be endorsed by the American Dental Association and be given wide circulation in every state in the Union. Measures for preserving teeth and conserving health. Mediums for broadcasting this information. Activities and success of the Southern Academy. Possibility of adoption of these plans, and in a larger way, by the Association. Economy of Southern Academy plan. Plans leading to a systematic establishment of mouth hygiene education in the public schools.

Discussed by
John Kennedy .....New York City

## HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY (RESEARCH)

(Section Hall No. 2, Convention and Exhibit Building. All subsequent meetings held in the same place.)

OFFICERS OF SECTION

Weston A. Price, Chairman ....Cleveland, Ohio
William Hopkinson, Vice-Chairman .....
.....Milwaukee, Wis.
Russell W. Bunting, Secretary .....
.....Ann Arbor, Mich.

## TUESDAY AFTERNOON, NOVEMBER 11

2 to 5 o'clock

"A Contribution to the Etiology of Mottled Enamel"

By Theodore B. Beust ....Louisville, Ky.

*Synopsis*—The subject is dealt with from the developmental and histologic aspect. The common types of hypoplasia are given consideration as far as their possible relationship to the lesion is concerned. Submitted evidence, illustrated with preparations, aims to show that the enamel defects are of chemicotraumatic origin.

"The Rôle of Bacillus Acidophilus in Dental Caries"

By Russell W. Bunting and Faith Palmerlee .....Ann Arbor, Mich.

*Synopsis*—A review of the previous investigation of this organism in its relation to dental caries is followed by a report of further study of the problem. Special attention has been directed toward beginning caries and the organisms found in the immediate locality of such lesions. Various types of *Bacillus acidophilus* have been isolated and their cultural characteristics and morphologic variations on different mediums noted. The relative frequency of the occurrence of these organisms in immune and susceptible mouths has also been studied. Artificial caries has been produced by pure culture of *Bacillus acidophilus* and by mixtures of this organism with other oral organisms, as well as by acids of known strength. The authors then describe the various methods by which they attempted to decrease the growth of *Bacillus acidophilus* in susceptible mouths for the prevention of dental caries.

"When and How We Get Our Teeth"

By J. S. Foote (M.D.) .....Omaha, Nebr.

## WEDNESDAY MORNING, NOVEMBER 12

9 to 12 o'clock

"A Consideration of the Factors Governing Successful Root Canal Operations; Causes of Periapical Infection"

By Carl J. Grove .....St. Paul, Minn.

"The Roentgen-Ray Negative Pulpless Tooth from a Bacteriologic and Experimental Standpoint"

By R. L. Haden .....Kansas City, Mo.

*Synopsis*—Cultures have been made of vital and pulpless teeth in deep tubes of glucose-brain-broth-agar. A quantitative study of the extent of periapical infection is thus possible. A comparison between the roentgenographic and bacteriologic findings is made. Bacteria recovered from areas of periapical infection have been injected into rabbits to determine the virulence of the organisms and to provide proof of the causal relationship of foci of infection to systemic disease. Cases illustrating elective localization are presented.

"The Etiology of Dental Caries"

By T. B. Hartzell and W. P. Larson .....Minneapolis, Minn.

## WEDNESDAY AFTERNOON, NOVEMBER 12

2 to 5 o'clock

"Dental Changes Observed in Deficiency Feeding Experiments with Monkeys"

By Percy R. Howe .....Boston, Mass.

"The Neutralization of Bacterial Toxins"

By W. P. Larson .....Minneapolis, Minn.

## THURSDAY MORNING, NOVEMBER 13

9 to 12 o'clock

"Early Signs or Markings Found on the Septal Gingivae and Gums, Indicative of Pathologic Processes"

By George H. Mengel .....El Paso, Texas

*Synopsis*—Special emphasis is made on the early diagnosis and treatment of gum lesions in children and young adults. Thirty-nine slides of photographs and diagrammatic drawings are presented.

"Further Studies of the Physical and Chemical Constitution of the Tooth Enamel"

By U. G. Rickert and E. O. Scott..... .....Ann Arbor, Mich.

*Synopsis*—A newer method for the determination of the often questioned organic content of dental enamel, including quantitative estimation is presented, with a comparison of good and poor qualities of enamels with carefully determined calcium and phosphorus determinations. As promised in last year's report, a method for accurately determining specific gravities and making comparisons in various qualities of enamels is given. These studies are intended to give more information regarding enamel changes after eruption of the tooth. The importance of such information is evident to all students studying dental caries.

# THE CLINIC PROGRAM

The clinic program for the Dallas meeting, as far as it has been completed to date, is herewith submitted.

All clinics will be given Thursday afternoon or Friday morning.

In order to insure an equitable distribution of clinicians, the allotment of clinics awarded to the several states has been in accordance with the membership in the American Dental Association, and is based upon state representation in the House of Delegates.

No clinician has been accepted without the endorsement of the president or a committee from his state society, the membership thus being assured of the selection of outstanding talent to represent each component organization.

A number of states have neglected to respond to the invitation up to this time, but we believe that much of the work now under way will result in the completion of their quota within the next few weeks.

It is hoped that the names of desirable clinicians holding membership in the states falling below their quota in this issue will be forwarded to the presidents of their respective state societies in order that their services may be secured in time for publication in the program.

Section clinics will be given in conjuction with the general clinics by essayists who desire to supplement the papers that they have presented before their respective sections. Thus, the subject matter of section discussions will become available to the entire membership.

Groups and study clubs will not be counted under the state limitation; but no state will be permitted to furnish more than three groups in addition to their authorized quota of individual clinicians.

The Texas State Dental Society, acting as our host, is in charge of the New South and Junior clinics.

The following eight states represent the New South: Texas, Southern California, Arizona, New Mexico, Oklahoma, Mississippi, Arkansas and Louisiana.

The Junior Clinics will consist of a number of 1920, 1921, 1922, 1923 and 1924 graduates, who will hold clinics on various subjects.

The Convention and Exhibit Hall in Dallas is magnificient and spacious, affording an excellent opportunity to stage all clinics under one roof. You cannot afford to miss the clinics.

H. B. PINNEY
*General Chairman of Clinics.*

## STATE AND GROUP CLINICS

### COLORADO

(Expected to furnish five clinicians)

"Orthodontia"
By Harry W. Wilson .....Denver

"Roentgen Ray"
By I. C. Brownlee .....Denver

### DELAWARE

(Expected to furnish two clinicians)

"Roentgenographic Records of Results of Root Canal Therapy"
By Clyde A. Nelson .....Milford

### GEORGIA

(Expected to furnish five clinicians)

"Pin Inlays and Vital Teeth as Abutments"
By Gerald A. Mitchell .....Atlanta

"New Thoughts on Porcelain Work"
By J. G. Williams .....Atlanta

"Rebasing Full Dentures"
By I. Murray Hair .....Atlanta

### Group Clinic

"Opening and Filling Root Canals by the Diffusion Method"
By M. D. Huff .....Atlanta
J. H. Lorenz .....Atlanta

### ILLINOIS

(Expected to furnish twenty-three clinicians)

Title of clinic to be announced.
By F. E. Roach .....Chicago

"Root Canal Technic"
By L. L. Davis .....Chicago

"Movable, Removable Bridgework"
By Lloyd S. Huhn .....Chicago

"Cast Inlays, Bridge Abutments and Bridge Assembly Without the Use of Solder"
By M. S. Sorley .....Chicago

"A New Articulator"
By Rupert E. Hall .....Chicago
Dr. Hall will show an improved precision ball bearing articulator for the simple and efficient grinding of dentures to central occlusion.

"*a.* Removable Bridgework; *b.* Partial Dentures; *c.* One Piece Castings"
By Polk E. Akers .....Chicago

Group Clinics

"Fixed Bridge Attachments for Vital Teeth"
By G. R. Churchill .....Chicago
F. G. Conklin .....Chicago
H. C. Lee .....Chicago
Special attention to the conservation of tooth structure. Demonstrated with the aid of large and small models and castings.

"Roentgenography"
By Charles W. Hillier, Chairman..Chicago
T. I. Lerche .....Chicago
Otto Windheim .....Chicago
Milton J. Cruse .....Chicago
A short course in roentgenography, leading up to the production of the type of roentgenogram that will permit of intelligent interpretation. Many fail in interpretation because of lack of preliminary knowledge: many others go astray because of the distortions, overexposure or faulty development procedure, all of which errors will be covered as thoroughly as time will permit.

"Progressive Amalgam Clinic"
By O. J. Olafsson, Chairman....Oak Park
S. H. Nannestad .....Chicago
E. I. Payne .....Chicago
E. G. Faller .....Chicago
H. R. H. Brevig .....Chicago
C. H. H. Brevig .....Chicago
The object of this clinic is to present some new and approved details in the procedure of amalgam technic.

1. Cavity preparation.
2. Mixing and plasticity. A thorough mix is essential to the stability of the completed filling. Proper plasticity is necessary for perfect adaptation.
3. Tamping. A process for the purpose of eliminating all air voids; likened to the agitation or jarring of a semifluid mass.
4. Orderly condensation. Has for its purpose equal packing in all parts of the filling.
5. Stepping the cavity walls. Elimination of final excess mercury and small imperfections at the danger points around the cavity walls.

IOWA

(Expected to furnish nine clinicians)

"Interpretation of Roentgenograms with Case Histories"
By E. A. Rogers .....Iowa City

"Correct Cavity Preparation and Inlay Restoration Demonstrated with Plaster Models"
By K. T. Orr .....Forest City

"Lower Anterior Bridge, Casting Gold Against Vulcanite Teeth"
By W. E. Spence .....Iowa City

"Models Before and After Extraction Showing Mouth Preparation for Dentures"
By G. E. Kauffman .....Des Moines

"Anatomic Crowns"
By C. M. Work .....Ottumwa

"Dr. Hancock's Method of Conductive Anesthesia, with Personal Modifications"
By R. D. Temple .....Burt

KANSAS

(Expected to furnish six clinicians)

"Direct Crown and Inlay Curved Indirectly and Its Practical Adaptation"
By Charles M. McCue .....Winfield

"Indirect Inlays with Swedged and Soldered Matrix"
By E. E. Ramsey .....Topeka

"A Method of Establishing Contact Points when Necessary to Place Two Approximating Inlays"
By G. E. Wright .....Wichita

"Comparative Results from Various Casting Waxes and Investments"
By G. E. Tilton .....Wichita

"Construction of Three-Quarter Crown by Semidirect Method"
By E. W. Rose .....Garden City

Group Clinic

SALINA STUDY CLUB

"Construction of Anterior and Posterior Bridges Using Three-Quarter Inlay Abutments, Baked Porcelain Roots and Cast Backings"
By W. E. Needles
A. Rothschild
H. T. Hervey

KENTUCKY

(Expected to furnish five clinicians)

"Rebasing Dentures"
By T. P. Sloan .....Lebanon Junction
Rebasing old and new full dentures, also rebasing and reestablishing occlusion on lower partial lingual bar cases.

"Physical Culture of Physical Therapy of the Gingiva"
By A. Moorman Hardway .....Louisville
Using colored models to illustrate technical points in tissue change.

"Demonstrating Cavity Classification for the Direct, Semidirect and Indirect Method of Obtaining Impression for Wax Pattern"
By L. C. Burgard .....Louisville
Practical demonstration of a quick carbonizing method and casting results.

"Practical Cavity Preparation"
By George H. Means .....Louisville

MAINE

(Expected to furnish three clinicians)

"*A*. Porcelain Jacket Crown Technic; *B*. Cavity Preparations for Inlays and Three-Quarter Crowns; *C*. A Study in Removable Bridge Work.
By George J. Anderson .....Portland

"Reasons for the use and proper application of Everett's wax for rebasing dentures, obtaining perfect adaptation and tissue balance under normal working stress"
By W. H. Thompson .....Portland

MICHIGAN

(Expected to furnish eleven clinicians)

"Balanced Occlusion in Full Denture Construction"
By A. A. Nelson .....Detroit

Group Clinic

"Engineering the Proper Angularity of Inclined Planes and Triangular Ridges, from a Study of Comparative Mandibular Movement with an Exhibit of Comparative Anatomy"
By Alex S. Diack .....Detroit
M. H. Miars .....Detroit

MISSOURI

(Expected to furnish nine clinicians)

"Orthodontia"
By Hugh G. Tanzey .....Kansas City

"Oral Surgery"
By Carl D. Lucas .....Kansas City

"Cavity Preparation"
By J. F. Alcorn .....St. Louis

"Attachments for Partial Dentures"
By George B. Scott .....St. Louis

"Demonstration of Four Widely and Favorably Known Articulations, with Practical Cases"
By Dayton D. Campbell .....Kansas City

"Splints for Face and Head Fractures and Bone Grafts"
By G. C. Smith .....St. Louis

"Removable Restorations"
By Charles P. Grosby .....St. Louis

Group Clinics

"Kansas City Crown and Bridge Unit"
By Roy J. Rinehart, Chairman
Fred E. Byers
Earl H. Westenhaver
Perry F. Gilbreath
J. H. Billings
V. V. Bele
C. E. Burgson
John C. Warnock
Richard M. Seibel
Lester N. Glaze

ST. LOUIS STUDY CLUB OF DENTISTRY

"Full Dentures"
By E. B. Owen
B. O. Haun

"Fixed Crown and Bridge Work"
By O. J. Fruth
J. F. Alcorn

"Partial Dentures"
By G. B. Scott

"Cast Gold Inlays"
By E. R. Hart

"Ceramics"
By Malcolm Robb

"Root Canal Technic"
By W. A. Chamberlain

"Conduction and Local Anesthesia"
By A. C. Engel
W. H. Wells

MONTANA

(Expected to furnish two clinicians)

"A New Stress Breaking Attachment for Partial Dentures"
By M. C. Roberts .....Butte

NEVADA

(Expected to furnish two clinicians)

"Gold Inlays"
By Thomas H. Suffall .....Reno

"Partial Denture Construction"
By Fred J. Rulison .....Reno

NORTH CAROLINA

(Expected to furnish three clinicians)

"Some Phases of Denture Work"
By L. V. Henderson .....Goldsboro

"Fixed Bridge, Illustrating Three-Quarter Cast Gold Attachments, the Dummy Teeth Having Porcelain Roots Extending into Sockets"
By J. A. McClung .....Winston-Salem

"Demonstration of the Various Uses of a Porcelain Bridge Tooth Giving a Glazed Adaptation to the Gum Tissue, and Manner of Attaching the Porcelain Tooth to Different Types of Bridges"
By L. J. Hooper .....Asheville

OHIO

(Expected to furnish ten clinicians)

"Data on Mouth Hygiene in School Work"
"By Harris R. C. Wilson .....Cleveland

"Industrial Dentistry"
By E. L. Pettibone .....Cleveland

"Orthodontia"
"By Frank M. Casto .....Cleveland

"Casting"
By John C. Lupton .....Cleveland

"Prophylaxis"
By Mary C. Newberry .....Cleveland

"The Structure and Function of the Alveolar Process"
By Hugh W. MacMillan .....Cincinnati

SOUTH DAKOTA

(Expected to furnish three clinicians)

"Amalgams"
By E. R. Doering .....Parkston

TENNESSEE

(Expected to furnish three clinicians)

"A New Technic for Porcelain Root Work, Baking the Porcelain over Fireproof Investment, Using a Special Facing"
By Joseph A. Gardner .....Memphis

"Technic for Stabilizing Lower Dentures"
By Bowen K. Bowen .....Nashville

"Bridge Attachments and Inlays"
By J. M. Rodgers .....Chattanooga

UTAH

(Expected to furnish three clinicians)

"Full Denture Construction"
By Victor H. Sears .....Salt Lake City

"Inlays"
By E. A. Hunt .....Salt Lake City

SECTION CLINICS

*Section One*

Operative Dentistry, Materia Medica and Therapeutics

"Studies of Materials and Methods Used in Casting and Their Practical Application"
By K. W. Knapp .....Minneapolis, Minn.

"Some Causes of Failure in Amalgam Fillings"
By W. J. Scruton ....Oklahoma City, Okla.

"Gold Foil Filling in the Disto-incisal Surface of an Upper Left Cuspid"
By W. R. Clack.....Mason City, Iowa

*Section Two*

Full Denture Prosthesis

"The Surgical Preparation of Mouths for Full Dentures"
By James A. Blue.....Birmingham, Ala.

"Esthetics, Showing the Grinding, Staining and Arrangement of Teeth for Full Dentures"
By F. M. Hight .....Houston, Tex.

*Section Three*

Partial Denture Prosthesis

"The Necessity of Occlusal Balance in Partial Denture Construction"
By G. E. Cleophas .....Beloit, Wis.

1. Models of the teeth and jaws and photographs of the patient before and after treatment in cases in which there has been mutilation of the natural dentures both by abrasion and by loss of teeth, with a consequent malposition of the mandible.
2. Principles that must be applied to retain this relationship in difficult partial restorations.

"New Methods in Removable Bridgework"
By J. J. Moffitt .....Harrisburg, Pa.
Replicas of practical removable bridges. Attachments for live teeth. Attachments for pulpless teeth. Methods and stages of construction. Casting the saddle and overcoming the elasticity of gums. Use of porcelain in removable bridgework. Removable bridges as an aid in orthodontia.

"Partial Denture Construction Eliminating Gingival Irritation"
By Charles A. Furrow .....Tulsa, Okla.
Methods used to insure tissue health in mouths in which extensive restorations are employed.

"Coordination of the Various Factors Entering into Partial Denture Construction"
By Walter F. Chappell ....Buffalo, N. Y.
Casts showing practical application of clasps, rests, indirect supports and stress breakers. Basis for determining saddle area, showing its relation to occlusal lines of stress.

*Section Four*

Oral Surgery, Exodontia and Anesthesia

"Extracting Technic Demonstrated by the Use of Wax Models"
By Boyd S. Gardner .....Rochester, Minn.

"Surgery to Make Denture Construction Possible"
By F. F. Molt .....Chicago, Ill.

*Section Five*

Orthodontia

"Impressions of Molar Teeth for Anchor Bands"
By Charles R. Baker .....Evanston, Ill.

"The Open Tube Orthodontic Appliance"
By James D. McCoy ....Los Angeles, Calif.

"The Substitution of Embrasure Hooks Soldered to Labial and Lingual Alinement Wires for Bands and Ligatures in Stabilizing Anchorage in the Treatment of Some Orthodontic Cases"
By Oscar E. Busby .....Dallas, Texas

*Section Six*

Mouth Hygiene and Preventive Dentistry

*Section Seven*

Histology, Physiology, Pathology, Bacteriology and Chemistry

"An Animal Demonstration of the Detoxifying Power of Surface Tension Depressants"
By Thomas B. Hartzell .....
.....Minneapolis, Minn.

NEW SOUTH CLINICS

"Casting Standardized in All its Phases"
By F. G. White .....Ft. Smith, Ark.
(*a*) Quick boil out technic. (*b*) Controlling contraction of gold and aluminum. (*c*) New method of tempering in the electric oven.

"Original Removable Orthodontia Appliances"
By Tom Comegys .....Shreveport, La.

"Original Type Stressbreaker for Removable Bridges"
By R. C. Murphy .....Shreveport, La.

"Gold Inlay Technic"
By A. T. Johnson .....Shreveport, La.

"Bowen-Neal Technic Lower Denture Construction"
By V. I. Miller .....Shreveport, La.

"Crown and Bridge Abutments"
By J. H. Brown .....Newton, Miss.

"A New Tooth Facing for Bridgework"
By H. D. Chipps .....Corinth, Miss.

"Porcelain Dummies for Bridgework"
By R. S. Neyland .....Jackson, Miss.

"Orthodontia Band Technic"
By Barney Kennedy .....Jackson, Miss.

"A New Method of Making a Gold Crown"
By C. M. Hurley .....Clayton, N. M.

"Articulating Anterior Counter-Sunk Pin Teeth with Posterior Long Base Diatorics in Plate Work"
By M. A. Grissom .....Roswell, N. M.

"Oral Surgery with Wax Models of Cases"
By J. B. Jenkins ....Oklahoma City, Okla.

"Internal Retention for Three-Quarter Crowns When Used as Bridge Abutments"
By E. L. Miley ....Oklahoma City, Okla.

"Denture Relativity"
By W. L. Dutcher ....Oklahoma City, Okla.

"Tooth Form Relative to Mastication"
By J. Goeringer .....Custer City, Okla.

"An Improved Technic for Lower Impressions"
By W. T. Jacobs .....Muskogee, Okla.

"Tooth Form Relative to Salesmanship"
By C. W. Benson .....Tulsa, Okla.

"Diet"
By A. L. Walters .....Tulsa, Okla.

"Closure of Cleft Palate (Surgical Clinic)"
By A. L. Frew .....Dallas, Texas

"Exodontia (Surgical Clinic)"
By A. C. Sloan .....Dallas, Texas

"Something in Broncoscopy"
By M. E. Tabor (M.D.) ....Dallas, Texas

"Porcelain Pontics"
By A. W. Odell .....Dallas, Texas

"Grinding, Staining and Arrangement of Teeth for Esthetics in Full Denture Construction"
By F. M. Hight .....Houston, Texas

"The Mechanical Removal of Brown Stain from Teeth"
By Clarence D. Wofford....Plainview, Texas
Patient with extreme case of brown stain will be shown with half of teeth treated. Other teeth will be treated in the clinic.

"Continuous Gum Dentures"
By J. M. McMinn .....Dallas, Texas

"Use of Small Electric Furnace (Costing Ten Dollars) in Porcelain Bridgework and Staining Teeth"
By H. H. Robertson .....Marlin, Texas

"Improved Method of Packing Upper Plate"
By W. T. Sims .....Hillsboro, Texas

"Remaking Full Upper and Lower Dentures Without Disturbing the Set-Up"
By J. M. Weems .....Sherman, Texas
C. M. English .....Sherman, Texas

"A Quick Aid to Esthetics"
By A. W. Gould .....Taylor, Texas

"Wiring Fractures"
By Trim Houston .....Corsicana, Texas

"The Time Factor in Preparation, Making and Finishing Dental Castings for Inlay Hoods and Crowns"
By Jack Hearne .....Fort Worth, Texas

"Method of Handling Nutro-Occlusion Cases in Orthodontia with Supra-Occlusion of Anterior Teeth"
By E. E. Moore .....Fort Worth, Texas

"Dentures that Harmonize with Typical Arch Form"
By B. F. Thielen .....Paris, Texas

"Regeneration of Alveolar Bone in Pyorrhea Treatment (Lantern Slides)"
By L. A. Neil .....El Paso, Texas

JOINT CLINIC

"Conductive Anesthesia with Curved Needles"
By L. W. Peart .....Alexandria, La.

"Resection and Suturing"
By C. G. Ducote .....Alexandria, La.

"Prevention of Malocclusions"
By Harvey Stallard ....San Diego, Calif.

Dr. Stallard, of San Diego, has given years of thought and investigation to external causes of malocclusion and will present facts, not theories, that will be of interest to everyone in the profession. It is the cause more than the cure we want in all lines of activities and if we can know the influences causing malocclusion, early enough, and its correction, much has been accomplished toward normal occlusion.

New South Group Clinics

WICHITA COUNTY DENTAL SOCIETY,
W. P. Bolding, Chairman

Partial Denture Prosthesis

*Section 1*

"Articulated Study Casts. Their Interpretation and Denture Design"
By R. E. Huff, Jr.

*Section 2*

"Sectional Impression Technic and Preparation of the Working Cast"
By E. E. Brown
N. H. Coleman

*Section 3*

"Surveying the Working Cast"
By M. R. Garrison

*Section 4*

"Plain Cast Clasps, Combination Cast Clasps, Investment and Casting Technic"
By E. E. Thornburgh

*Section 5*

"Preparation of Counter-Dies for Wire Clasps, Swaging Wire and Plate Clasps"
By C. E. Bailey
W. H. Felder

*Section 6*

"The Lingual Bar and Its Adaptation, Indirect Support for Lower Partial Dentures and the Use of the Continuous Lingual Cast Clasp"
By A. R. Prothro
L. E. Tompkins

*Section 7*

"The Palatal Bar"
By R. G. Anderson

*Section 8*

"The Technic for the Adaptation of the Wax Pattern and Its Investment, for Partially Covering All or Nearly All of the Roof of the Mouth"
By J. D. Simms
W. T. Wells

*Section 9*

"The Use of Trubridge Teeth"
By V. E. Wratten

*Section 10*

"Assemblage of Component Parts of Completed Structure"
By H. B. White

EL PASO COUNTY DENTAL SOCIETY

"Indirect Inlays"
By J. M. Ridley
J. A. Schaffer
M. L. Parker
J. H. Paget
V. L. Izard
J. D. Stevens

FORT WORTH DENTAL SOCIETY

"Favorable and Unfavorable Mouths for Full Metal Dentures"
By R. V. Woolwine
Field Farrar
F. G. Garrison

Practical cases, patients supplied.

HOUSTON DENTAL SOCIETY

(Title to be supplied)
By E. L. Williams
R. C. Cooley
W. T. Newton

LOS ANGLES COUNTY SOCIETY GROUP

"Dental Ceramics"
By C. O. McBean, *Chairman*
W. E. Sibley
Loyd J. Taylor
Floyd G. Oldham
O. L. Bates

Illustrated lecture showing physical and chemical control of porcelain, also the ethics obtained in the construction of bridgework, combining the principle of the cast gold crown abutment and the veneer crown.

JUNIOR CLINICS

"How to Take Useful Case Histories, and Their Importance"
By F. J. Reichmann .....
.....Oklahoma City, Okla.

"Preparation of Cavities, Lingual Third and Class 3 and 4 for Porcelain Inlays; also Successive Steps in Porcelain Baking"
By G. H. Williams....Oklahoma City, Okla.

"Porcelain Jacket Crown Work"
By Robert B. Lockridge .....
.....Oklahoma City, Okla.

"Indirect Method in Inlay Work"
By S. S. Morgan .....Frost, Texas
Fred Owen .....Corsicana, Texas

"Indirect Method of Inlays"
By S. E. Mills .....Houston, Texas

"Articulation and Grinding in Full Dentures"
By B. P. Taylor .....Houston, Texas

"Some Orthodontia Cases under Treatment"
By L. S. Winston .....Houston, Texas

"Pinledge Attachments for Anterior Fixed Bridgework"
By C. W. Yetter .....Saint Jo, Texas

"Posterior Fixed Bridgework"
By O. L. Swepston .....Dallas, Texas

"Indirect Inlay Method"
By T. A. Lipscomb .....Dallas, Texas

"(*a*) A Bite Plane for Vacation Time. (*b*) Removing Impactions by Orthodontia Appliance"
By Frank H. Harrison ....Waco, Texas

"Construction of Obturator in Practical Case"
By Kenneth A. Ragsdale .....
.....San Antonio, Texas

"Method of Replacing Broken Facing in Fixed Bridgework in the Mouth"
By Robert J. Mooney..San Antonio, Texas

"Partial Lower Denture Construction"
By H. L. Ericson....San Antonio, Texas

"Full Lower Denture Construction"
By R. A. Ericson....San Antonio, Texas

# THE DALLAS SESSION

## REPORT OF THE GENERAL CHAIRMAN OF THE LOCAL ARRANGEMENTS COMMITTEE

Dallas and Texas and the New South states are marking time in happy anticipation of the coming Convention of the American Dental Association, November 10 to 14. It is with much pleasure that, at this time, I am able to report that all general arrangements are complete, and, from now until the meeting, only the minor details of preparation are to be carried out.

Our Local Arrangements Committee consists of nine Dallas dentists, with an advisory committee of dentists from the different sections of the state. The local committee was appointed by the President of the American Dental Association, Dr. William A. Giffen, at a called meeting of the Dallas County Dental Society, Oct. 22, 1923, at which Dr. Giffen and Dr. Otto U. King, Secretary of the Association, were present.

It is evident from the way local arrangements have gone forward that each member of the local committee was well chosen for the particular work laid out for him. From the very start, every man entered into his work with intelligence and vim, and has never let up.

We believe that we have developed one of the best systems of arrangements for this meeting in the history of the Association. As has been previously stated, all sections, as well as the exhibits, will be under one roof and on the same floor, in a building well lighted and well ventilated. Ample dining hall space will be provided for serving noon-day lunches. As each of the sections will be segregated at this hour, it will be possible for them to lunch by themselves. Special entertainment will be provided and talks will be given to the members of each section during the luncheon hour.

Dr. Harrison B. Cave, Chairman of the Committee on Entertainment, has worked out a line of entertainment that we believe will be enjoyed by all, and, knowing Dr. Cave's originality along this line as I do, I have no fear as to the outcome of our entertainment features.

Dr. Bush Jones, Chairman of the Committee on Exhibits, reports that the greater part of the space provided for the exhibitors has been taken. Again we feel that the close proximity of all the sectional meetings to the exhibitors will give the latter one of the best opportunities to create interest that they have ever had. The exhibitors have been requested to have their exhibits all in place and ready for the opening, Monday, November 10, and to allow them to remain on exhibit until the close of the convention, Friday afternoon, November 14. The exhibits will remain open each day, continuously, until 6 p. m.

Dr. Allen N. Kearby, Chairman of the Committee on Halls and Hotels, is keeping a close check on hotel reservations and, judging from the number of reservations already made, the attendance will be far greater than we had

The Jefferson Hotel

anticipated. Dallas will be well able to take care of all those who attend the convention regardless of how large the number may be, but, as far as possible, we would request that two or more members plan to room together.

The Committee on Information, under the guidance of Dr. G. Waller Staples, Chairman, have the details of their work already so carefully planned that the stranger in our city will have no trouble in getting any necessary information that he may need.

Dr. W. P. Delafield, Chairman of the Committee on Public Health Exhibit, and his committee have their work thoroughly organized, and, from the reports coming in, the health exhibit this year will surpass that of any previous year. The exhibit will be in the main Convention Hall adjoining the manufacturers' exhibit. Many very valuable health exhibits have already been allotted space. There will also be a continuous health moving picture show in connection with the exhibit.

Baylor University will have on display a

series of prepared wet specimens that I am sure will prove very interesting to all students of anatomy.

The clinics, under Dr. A. L. Nygard, Chairman of the Committee on Clinics, will be well arranged in a part of the main Convention Hall, and, from the data already obtained, the clinic program promises to be one of the largest and best ever presented by the Association.

Dr. J. J. Simmons, Chairman of the Committee on Publicity, has handled the publicity, from the Dallas point of view, in a very creditable manner. During the whole year he has kept in touch with our dental journals, furnishing them with articles and pictures of Dallas. He has also furnished many articles to the local papers.

Last, but by no means least, our ever watchful and energetic Secretary and Treasurer, Doctor J. G. Fife, has kept an accurate record of all proceedings of our committee meetings, and at all times can give any information desired on any part of the local arrangement work. He is keeping a model set of books, and I am sure the auditors will have no trouble in giving a quick and accurate report.

The cooperation of the Dallas Chamber of Commerce, the Hotel Men's Association and the people of Dallas has been all that we could ask, and I am sure that when our guests arrive next November they will be assured of a hearty welcome and comfortable quarters.

A. L. FREW, *General Chairman.*

## TEXAS AND DALLAS READY FOR THE AMERICAN MEETING

"Know all men by these presence" etc., that the dental profession of Texas, with activities now centered at Dallas, for, and in consideration alone of the compensation to be derived through the joy of service well performed, is making elaborate plans and executing them, for housing and entertaining the Convention of the American Dental Association to be held at Dallas, November 10 to 14 next; also

That the Local Arrangement Committee, on which has been placed the responsibility of devising and perfecting these plans, is so well advanced with its work that all arrangements could be completed, ready for the opening, on very short notice.

That Dallas hardly expects to succeed in inducing even as many as half of the thirty odd thousand members of the Association to attend this convention, but, that her county society, her chamber of commerce and hotel men's association, backed by the whole city, are ready to undertake the entertaining, not only of all members of the Association, but, in addition, of as many members of the American Trade Association as can be induced to come.

That the hotels of Dallas are metropolitan

Southland Hotel

in size, appearance, appointments and management, and will take the best care of all visitors.

That the great Convention and Exhibit Hall is a marvelous building in capacity and adaptability to the purposes of the Convention, and the large section to be devoted to the Manufacturer's Exhibits is now practically ready for the exhibitors to move in.

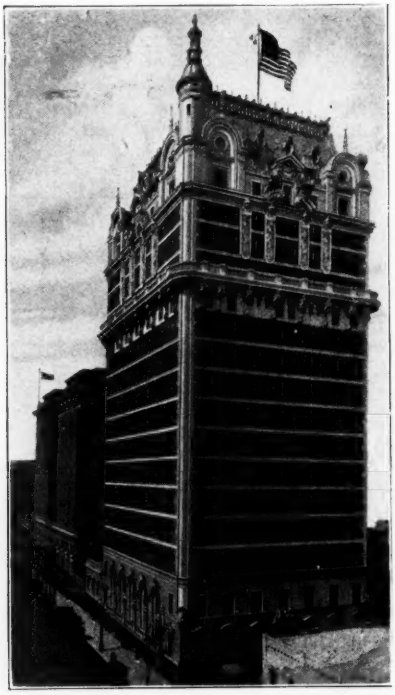
That, in addition, the entire program of the Convention (with the exception of two night sessions), and the Public Health Exhibit, will be held in this building and on the same floor. And finally

That Dallas knows how and is accustomed to handle big crowds; that she has entertained the Shrine on several occasions, the last time when there were 50,000 in attendance, and, that annually, at the greatest state

exposition in existence, she often takes care of as many as 100,000 visitors daily.

Come to Texas, the land of Sam Houston and King Cotton, and sample her brand of hospitality!

J. G. FIFE, *Secretary-Treasurer.*



The Adolphus Hotel

## DENTAL HEALTH EXHIBIT

One of the many interesting and instructive features of the Dallas meeting will be the Dental Health Exhibit.

While it is too early at this time to give in detail all that will be included in this exhibit, we feel sure that it will surpass any yet shown.

The space is ample and ideal in every respect and in the same great convention hall where the entire meeting will be held. The space is ideal in arrangement and so accessible to all. There is no doubt that it will be a most interesting feature of the meeting. The space is so arranged that the public can be invited to see this exhibit and yet not interfere with any other part of the meeting.

A visual presentation of the problem of nutrition as related to the child, dealing with prenatal nutrition of both child and mother, continuous motion pictures dealing with mouth hygiene, and exhibits from dental infirmaries and schools are but a few of the interesting features of this exhibit.

The Local Committees have the assurance from the Texas societies that they will secure an interesting exhibit.

The state board of health promises their cooperation in making the Texas exhibit very instructive.

The real purpose of the exhibit is to suggest to the dentists of this country the important things relating to dental health, so that they will be better prepared to go back to their work and give to their communities the things that make for healthier and longer lives.

W. P. DELAFIELD, *Chairman,*
Committee on Public Health Exhibit.

## CLINICS

The plan of presenting the clinics at the Dallas meeting we feel has a distinct advantage over the plans followed at previous meetings. The table clinics and group clinics will be shown on four rows of tables running the full length of the hall. The group clinics can be viewed in their order without any delay or disadvantage of hunting for a particular part of the clinic. The clinics will be so numbered and the names of clinicians so arranged that the dentists will have no trouble locating the particular clinics in which he is interested. Three large beautifully equipped hospitals are provided to take care of the surgical clinics. Spacious rooms with ample seating capacity are provided for lantern clinics, all under the same roof. The greatest clinical program the American Dental Association has ever provided will be shown at the Dallas meeting. Every type of clinic will be shown, providing a wonderful chance to view the best in the way of technic, etc., as presented by men selected all over the United States for their skill and knowledge, and will give every man a chance to carry home a fund of new ideas and knowledge.

A. L. NYGARD, *Chairman,*
Committee on Clinics.

## ENTERTAINMENT

It is the desire and intention of the Entertainment Committee to do everything for the pleasure, comfort and amusement of our guests.

We will have all the automobiles necessary

for the use of our visitors. Our Texas members have been requested to drive their cars to the meeting, which will give us 1,000 automobiles in addition to the number that will be furnished by our local automobile club.

On Monday evening, while the various Greek Letter fraternities are holding their annual banquests, there will be staged a "Barbarian Entertainment" at the Scottish Rite Cathedral (which by way of explanation, is one of the finest in the South).

In the spacious and beautiful banquet hall, a dance will be in progress, with a splendid orchestra, and in the Degree Auditorium will be a vaudeville program for the amusement of those who do not wish to trip the light fantastic.

This entertainment will be open to all our visitors.

Our noonday luncheons will be served on the same premises as our meeting, and arrangements are being made to seat 3,000 at each meal.

Special programs will be given each day, and a separate chairman has been selected for each luncheon.

A nominal charge will be made for season tickets to these luncheons, and the food will be prepared and served by the best and most experienced caterer in the Southwest.

On Thursday evening, there will be staged the big entertainment, the nature of which will be kept secret, but will be given publicity at the proper time.

The golfers will have their annual banquet at the Adolphus Hotel, Sunday evening, and they will hold their golf tournament, Monday, November 10. The use of the Dallas Golf and Country Club, Lakewood, Brook Hollow, Cedar Crest and Glen Haven golf clubs have been secured for the golfers.

The ladies' auxiliary of the Dallas County Dental Society will maintain headquarters at the Adolphus Hotel, and a large number of the members will be on hand to take care of the visiting ladies. A special luncheon will be arranged for them at one of the country clubs, and automobile rides will be arranged daily for a visit over the beautiful streets and boulevards of Dallas, together with shopping tours.

A Portion of Bath House Row, Hot Springs National Park

A splendid program is being arranged for the Blue Rock Shoot, and the Dallas Gun Club Field has been secured for this purpose.

Every member of the Texas Dental Society is a member of the Entertainment Committee and will be pressed into service.

We of the Southwest pride ourselves on our hospitality and those who have entered our portals will agree with us that there is none better, and those who have never been so fortunate have a wonderful treat coming to them.

The Entertainment Committee cordially invites you to visit us November 10-14, 1924.

HARRISON B. CAVE, *Chairman,*
Committee on Entertainment.

## TRANSPORTATION TO THE DALLAS MEETING

An Identification Certificate will be mailed to each member of the Association in ample time for the meeting. When properly filled out and presented to the local agent, members and dependent members of their families may purchase round-trip tickets at one and one-half fare, good going from November 6 to 12, inclusive, with return limit November 20, with the following exceptions: from British Columbia, California, Idaho, Nevada, Oregon and Washington, tickets will be on sale November 4 to 10, inclusive, with return limit November 22, 1924. From Arizona, Manitoba, Minnesota, Montana, Northern Michigan North Dakota, South Dakota, Utah and Wisconsin, tickets will be on sale November 5 to 11, inclusive, with final return limit November 21, 1924.

### Special Train

Arrangements have been made for a special train from Chicago, St. Louis, Kansas City and Memphis to Dallas, Texas. This train will carry combination baggage and smoking car and all steel drawing room and compartment cars, as well as a compartment observation sleeper. Through cars for special groups will be attached to the special train.

### Schedule of Special Train

| | | | |
|---|---|---|---|
| Lv. Chicago | 3.00p.m. | Nov. 7th, | I.C.R.R. |
| Ar. St. Louis | 10.00p.m. | Nov. 7th, | I.C.R.R. |
| Lv. St. Louis | 10.30p.m. | Nov. 7th, | Mo.Pac. |
| Ar. Little Rock | 8.00a.m. | Nov. 8th, | Mo.Pac. |
| Lv. Memphis | 11.30p.m. | Nov. 7th, | Mo.Pac. |
| Ar. Little Rock | 3.55a.m. | Nov. 8th, | Mo.Pac. |
| Lv. Kansas City | 4.00p.m. | Nov. 7th, | Mo.Pac. |
| Ar. Little Rock | 7.25a.m. | Nov. 8th, | Mo.Pac. |
| Lv. Little Rock | 10.00a.m. | Nov. 8th, | Mo.Pac. |
| Ar. Hot Springs | 12.00noon | Nov. 8th, | Mo.Pac. |
| Lv. Hot Springs | 9.30p.m. | Nov. 8th, | Mo.Pac. |
| Ar. Dallas | 8.00a.m. | Nov. 9th, | Tex.&Pac. |

Saturday, November 8, will be devoted to sightseeing in Little Rock and Hot Springs, the train leaving the latter place that night and arriving in Dallas on Sunday morning at 8 o'clock.

### Round-Trip Railroad Fares

| | |
|---|---|
| Chicago | $ 51.54 |
| Detroit, via Chicago or St. Louis | 62.69 |
| Grand Rapids, via Chicago or St. Louis | 61.49 |
| Milwaukee, via Chicago | 56.13 |
| Minneapolis-St. Paul, via Chicago | 67.16 |
| via St. Louis | 56.81 |
| Philadelphia, via Chicago or St. Louis | 82.98 |
| Washington, D. C., via Chicago | 82.98 |
| via B. & O. via St. Louis | 75.63 |
| via Penna. R. R. via St. Louis | 77.79 |
| Cleveland, via Chicago or St. Louis | 64.70 |
| Boston, Mass., via Chicago or St. Louis | 98.69 |
| New York, via Chicago or St. Louis | 87.84 |
| Toledo, via Chicago or St. Louis | 59.93 |
| Pittsburgh, via Chicago or St. Louis | 69.06 |
| Cincinnati, via St. Louis | 52.28 |
| Louisville, via St. Louis | 45.83 |
| Nashville, via Memphis | 38.15 |
| St. Louis | 36.05 |
| Memphis | 25.28 |
| Kansas City, via Little Rock | 40.14 |
| Omaha, via Kansas City and Little Rock | 50.90 |
| Seattle, Wash. | 126.39 |
| Portland, Ore. | 119.30 |
| San Francisco, Calif. | 94.94 |
| Los Angeles, Calif. | 78.98 |
| San Diego, Calif. | 78.98 |

Proportionate fares from all other territory; Pullman fares additional.

Above rates do not include round trip rate of $2.00 Benton, Ark., (on main line) to Hot Springs and return.

### Pullman Fares

| | Lower berth | Upper berth | Compartment | D. R. |
|---|---|---|---|---|
| Chicago | $11.75 | $9.40 | $33.50 | $41.50 |
| St. Louis | 9.50 | 7.60 | 26.75 | 34.00 |
| Memphis | 7.25 | 5.80 | 20.75 | 26.00 |
| Kansas City | 7.63 | 6.10 | 21.50 | 27.50 |

### Water and Rail Route

From New York to Galveston via Mallory lines, sailings are on Wednesday at noon. The fare including berth and meals is $63. The railroad fare from Galveston to New York via Dallas is $63.77. The trip from New York to Galveston requires six days.

From New York to New Orleans via Southern Pacific lines, sailings are Saturday noon, with arrival in New Orleans the following Friday. The fare from New York to New Orleans including berth and meals is $60. The railroad fare from New Orleans to New York via Dallas is $78.88.

Those traveling via Chicago or starting from that point, will make Pullman reservations through

W. G. Ferstel, District Passenger Agent, Illinois Central Railroad, 208 S. La Salle St., Chicago, Ill.

J. J. McQueen, General Agent, Passenger Department, Missouri Pacific Railroad, 714 Standard Trust Bldg., Chicago, Ill.

Those traveling via St. Louis or starting from that city, make reservations through

J. M. Griffin, Division Passenger Agent, Missouri Pacific Railroad, 1650 Railway Exchange Bldg., St. Louis, Mo.

Those traveling via Memphis or starting from that city, make reservations through

T. D. Moss, Division Passenger Agent, Mis-

souri Pacific Railroad, 270 Shrine Bldg., Memphis, Tenn.

Those traveling via Kansas City or starting from that city, make reservations through

W. H. Donny, Assistant General Passenger Agent, Missouri Pacific Railroad, Railway Exchange Bldg., Kansas City, Mo.

For further particulars concerning the special train please take up with any Illinois Central or Missouri Pacific representative listed above.

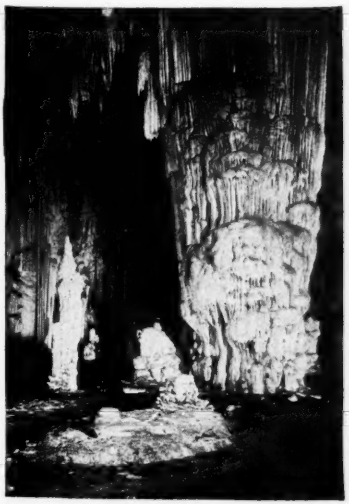
## OLD MEXICO

A most interesting and attractive trip through Old Mexico has been planned on the following schedule:

Leaving Dallas on Friday at 10:00 p. m. after the last day of the Convention, our special sleepers will arrive in San Antonio on Saturday at 7:45 a. m. Busses will convey us to the Menger Hotel for breakfast. Then back to the same cars, we leave at 9:30 a. m. for Monterrey, our first stop in Old Mexico, where we will spend Sunday afternoon and evening. Monterrey is an industrial center, but is also interesting for its cathedral, its fine state palace, and the ruin of the old "Bishop's Palace" dating back to 1785, the storm center of the historic battle of Monterrey, the most important of the Mexican war.

Leaving Monterrey on board our special

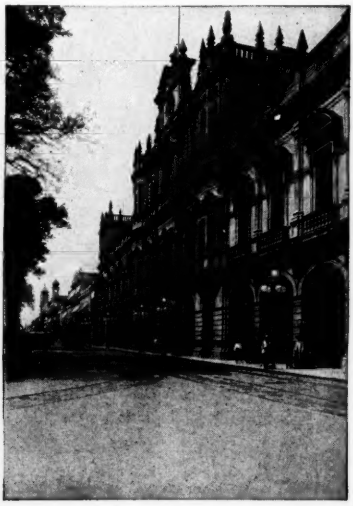
| | | | | |
|---|---|---|---|---|
| Lv. Dallas | 10:00 p. m. | Southern Pacific Lines | Friday, | Nov. 14 |
| Ar. San Antonio | 7:45 a. m. | Southern Pacific Lines | Saturday, | Nov. 15 |
| Lv. San Antonio | 9:30 a. m. | I-GN | Saturday, | Nov. 15 |
| Ar. Monterrey | 2:50 p. m. | National Lines of Mexico | Sunday, | Nov. 16 |
| Lv. Monterrey | 2:35 a. m. | National Lines of Mexico | Monday, | Nov. 17 |
| Ar. Mexico City | 6:00 a. m. | National Lines of Mexico | Tuesday, | Nov. 18 |
| Lv. Mexico City | 7:01 a. m. | National Lines of Mexico | Wednesday, | Nov. 19 |
| Ar. Puebla | 12:25 p. m. | National Lines of Mexico | Wednesday, | Nov. 19 |
| Lv. Puebla | 2:45 p. m. | National Lines of Mexico | Wednesday, | Nov. 19 |
| Ar. Mexico City | 8:10 p. m. | National Lines of Mexico | Wednesday, | Nov. 19 |
| Lv. Mexico City | 7:00 a. m. | National Lines of Mexico | Friday, | Nov. 21 |
| Ar. Cuernavaca | 11:37 a. m. | National Lines of Mexico | Friday, | Nov. 21 |
| Lv. Cuernavaca | 1:01 p. m. | National Lines of Mexico | Saturday, | Nov. 22 |
| Ar. Mexico City | 6:45 p. m. | National Lines of Mexico | Saturday, | Nov. 22 |
| Lv. Mexico City | 7:00 a. m. | National Lines of Mexico | Monday, | Nov. 24 |
| Ar. Queretaro | 1:54 p. m. | National Lines of Mexico | Monday, | Nov. 24 |
| Lv. Queretaro | 1:20 a. m. | National Lines of Mexico | Tuesday, | Nov. 25 |
| Ar. San Antonio | 3:45 p. m. | I-GN | Thursday, | Nov. 27 |



Cacahuamilpa Caverns near Cuernavaca

One of Mexico's many waterfalls

sleepers, we reach Mexico City on Tuesday morning. The attractions in Mexico City are so many and so varied that it is difficult to arrange a program for a party. But no one will wish to miss the imposing Cathedral of Mexico, the plaza Zocalo, the magnificent Paseo (Boulevard) de la Reforma, a block wide, lined with heroic statuary; the little forest of Chapultepec surrounding the castle that was the seat of the emperors of the Aztecs, served as the palace of Maximilian, and is now the "White House" of all the presidents of Mexico; the National Museum, the National School of Medicine, which is built over the torture chambers of the Inquisition, the National Theater completed at a cost of more than $10,000,000, the wonderful floating gardens, the Viga canal, the flower market, the Pyramid of Cholulo, etc. Tuesday and Thursday, November 18 and 20, will be spent in this most interesting city.



· Street scene and cathedral in Puebla

Wednesday, November 19, we leave Mexico City for a visit to Puebla, a trip of wonderful scenic beauty. A luncheon at Puebla and a ride around this "City of the Angels'" with its churches, homes and public buildings adorned with glazed tiles of many colors, and its quaint legends, should prove most entertaining.

Another day (November 20) in Mexico City, and then on Friday, November 21, we go to Cuernavaca, a journey of 74 miles through scenery so "perfectly sublime one never forgets it." Arriving at 11:37 a. m., the "burro" motive power street cars will take our party to the Morelos Hotel for luncheon. Cortez built a palace here in 1530, which is still standing. The sugar mill used in his day is still in use, and not far away is a hunting lodge built by Maximilian. The famous Borda Gardens, beautiful beyond description, are here. Every waking moment of our twenty-six hour stay in Cuernavaca should be replete with interest and enjoyment.

Returning to Mexico City on Saturday evening, we have a night of rest to prepare us for the day of all days—a Sunday in Old Mexico. The band concert in the Alameda on Sunday morning must not be missed, and on Sunday afternoon the bull fight.

Our return journey will begin on Monday, November 24 at 7:00 a. m., when we board our special sleepers. We will make one stop at Queretaro, where we will spend Monday afternoon. Queretaro was the site of Maximilian's execution, and a little chapel on the "Hill of the Bells" marks the exact spot where he and his two generals stood. Queretaro is famous for its opals.

Leaving Queretaro at 9:30 on Monday eve-

ning, we will arrive in San Antonio, Thursday, November 27, at 3:45 p. m., and the afternoon will be spent in sightseeing in that historic old city.

### Routing of Tickets

On account of the six-day limit on the Identification Certificates, it will be necessary for those going to Mexico to purchase winter tourist tickets, good from October 1 to April 30. This will make the trip available to all members of the American Dental Association and their friends as well.

Those desiring to remain with the party back to St. Louis, Chicago or points east, should have their tickets made out over the route of the special train to Dallas, thence via the Southern Pacific to San Antonio, I-GN to Laredo and same route returning.

### National Lines of Mexico to Mexico City

Should anyone wish to remain in Mexico for a longer period, he can do so. Some may wish to go on to Vera Cruz and return by water, either to Havana or New York. Others may wish to leave the party at San Antonio and return by another route. Winter tourist tickets allowing diverse routes in the United States will run $10.00 higher than tickets over the same route going and returning. The following suggestions are made for those desiring a change of route returning from San Antonio:

Southern Pacific through Houston (side trip to Galveston) to New Orleans, thence by the I. C. direct line to points North and East; or L. & N. and C. & E. I. through Nashville; or should any wish to return via Brownsville and the Rio Grande Valley (Gulf Coast Lines) they should leave the party at Laredo.

Approximate winter tourist rates to Mexico City, going and returning via the same route follow:

Business street in Mexico City

| | |
|---|---|
| New York | $176.46 |
| Philadelphia | 170.64 |
| Chicago | 130.10 |
| Kansas City | 104.75 |
| St. Louis | 113.40 |
| Memphis | 101.35 |
| Detroit | 144.40 |

The above quoted rates were effective during the 1923 season. The 1924 rates will be about the same.

The Pullman rates from Dallas to Mexico City, and returning to San Antonio follow:

Dallas to Laredo: Lower, $5.63; Upper, $4.50; Compt. $15.75; Dr. Room, $21.00.

Laredo to Mexico City: Lower, $12.73; Upper, $10.18; Compt. $35.83; Dr. Room, $48.53. A charge of $41.25 per car which will

be added for a half day stop over at Monterrey will be prorated.

Mexico City to Laredo: Lower, $12.73; Upper, $10.18; Compt. $35.83; Dr. Room, $48.53.

Laredo to San Antonio: Lower, $3.75; Upper, $3.00; Compt. $10.50; Dr. Room, $13.50. A charge of $41.25 per car which will be added for a stop over at Queretaro will be prorated.

The railroad fare for side trips, Mexico City to Puebla and return, is $6.80; Mexico City to Cuernavaca and return, $4.70.

Expenses, such as for hotels, meals and sight seeing burros, will be in addition to the foregoing.

Hotel reservations, sightseeing trips etc., will all be arranged in advance by the chairman of the transportation committee. Please remember that this trip will be made down and back at actual cost. Tour companies, as you know, make a charge over and above cost for handling details, etc.

The customs agent at the border allows entry, free of duty, of 300 cigarets, fifty cigars and a reasonable amount of souvenirs, pottery, drawn work, opals, etc.

Those wishing an attractive booklet on Mexico can obtain a copy through the Chairman of the Transportation Committee.

Make your reservations early, advising space desired, whether drawing room, compartment, section or lower.

D. C. BACON, *Chairman*,
Transportation Committee,
31 North State St., Chicago, Ill.

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## REPORT OF COMMITTEE ON EXHIBITS

The building in which the American Dental Association will hold its meeting in Dallas, November 10-14, 1924, was built by the manufacturers of Dallas in order that they could hold exhibitions of their goods, and the spaces are all built in ready for the exhibitors of dental goods to unpack their products and place them in position for the members of the American Dental Association to inspect.

In fact, the Committee on Exhibits could be ready on one week's notice to put on exhibition the largest, finest and most representative exhibit of dental goods that has ever been held in the South.

From the exhibitor's standpoint, this meeting will give them the best opportunity that they have ever had, in that everything about this meeting will be held under one roof and the members will be on one floor, to attend the lectures, clinics and exhibits, passing from one to the other at will; hence, it will put the exhibitors in touch with the members at all times, and the section chairmen will have to hustle or the exhibitors will hold the audience.

Another thing that will make this exhibition especially attractive for exhibitors is that it is a virgin field, and no such exhibition as this one has ever been held in this section; therefore, about 2,000 will be in attendance from this section, very few of whom have ever attended a national meeting. These men will be eager to see the new appliances, instruments and materials.

The Committee on Exhibits has no hesitancy in saying that the exhibits this year will be one of the main attractions of the American Dental Association meeting, for so many exhibitors have engaged space that success is assured.

The Committee on Exhibits will be in constant attendance during the meeting to assist the exhibitors, and also to help the members take advantage of this wonderful opportunity.

The following exhibitors have reserved from one to four spaces:

LIST OF EXHIBITORS

The Abbott Laboratories, Chicago, Ill.

The American Cabinet Co., Two Rivers, Wis.

W. V.-B. Ames Co., Fremont, Ohio.

Becton, Dickinson & Co., Rutherford, N. J.

Henry P. Boos, Minneapolis, Minn.

Harry J. Bosworth Co., Chicago, Ill.

Bristol-Myers Co., New York, N. Y.

Burns Dental Casting Machine Co., Flushing, L. I., N. Y.

Cameron Surgical Specialty Co., Chicago, Ill.

Castle, Wilmot, Co., Rochester, N. Y.

The L. D. Caulk Company, Milford, Del.

Cleveland Dental Mfg. Co., Cleveland, Ohio.

Colgate & Co., New York, N. Y.
Columbus Dental Mfg. Co., Columbus, Ohio.
Cook Laboratories, Chicago, Ill.
Corega Chemical Co., Cleveland, Ohio.

Dental Products Co., Chicago, Ill.
Dental Specialty Co., Denver, Colo.
The Dentists' Supply Co., New York, N. Y.
Detroit Dental Mfg. Co., Detroit, Mich.
Dresch Laboratories Co., Toledo, Ohio.
August E. Drucker Co., San Francisco, Calif.

Eastman Kodak Co., Rochester, N. Y.

Florence Mfg. Co., Florence, Mass.
Flossy Dental Mfg. Co., Evanston, Ill.
Friedman Specialty Co., Chicago, Ill.

Hanovia Chemical Co., Newark, N. J.
The Heidbrink Co., Minneapolis, Minn.
Horlick's Malted Milk Co., Racine, Wis.

J. F. Jelenko & Co., New York., N. Y.
Johnson & Johnson, New Brunswick, N. J.

Kansas City Oxygen-Gas Co., Kansas City, Mo.
The Kolynos Co., New Haven, Conn.

Lambert Pharmacal Co., St. Louis, Mo.
H. R. Lathrop & Co., New York, N. Y.
Lavoris Chemical Co., Minneapolis, Minn.
Lea & Febiger, Philadelphia, Pa.
Lehn & Fink, Inc., New York, N. Y.

Medical Protective Co., Fort Wayne, Ind.
Metcalf & Thomas, Ft. Worth, Texas.

H. A. Metz Laboratories, New York, N. Y.
Mizzy, Inc., New York, N. Y.
E. C. Miller Co., Williamsport, Pa.
C. V. Mosby Co., St. Louis, Mo.
Mynol Chemical Co., Philadelphia, Pa.

J. M. Ney Co., Hartford, Conn.

The Pelton & Crane Co., Detroit, Mich.
The Pepsodent Co., Chicago, Ill.
Chas. H. Phillips Chemical Co., New York, N. Y.
Poloris Co., Inc., New York, N. Y.

Ransom & Randolph, Toledo, Ohio.
Ritter Dental Mfg. Co., Rochester, N. Y.

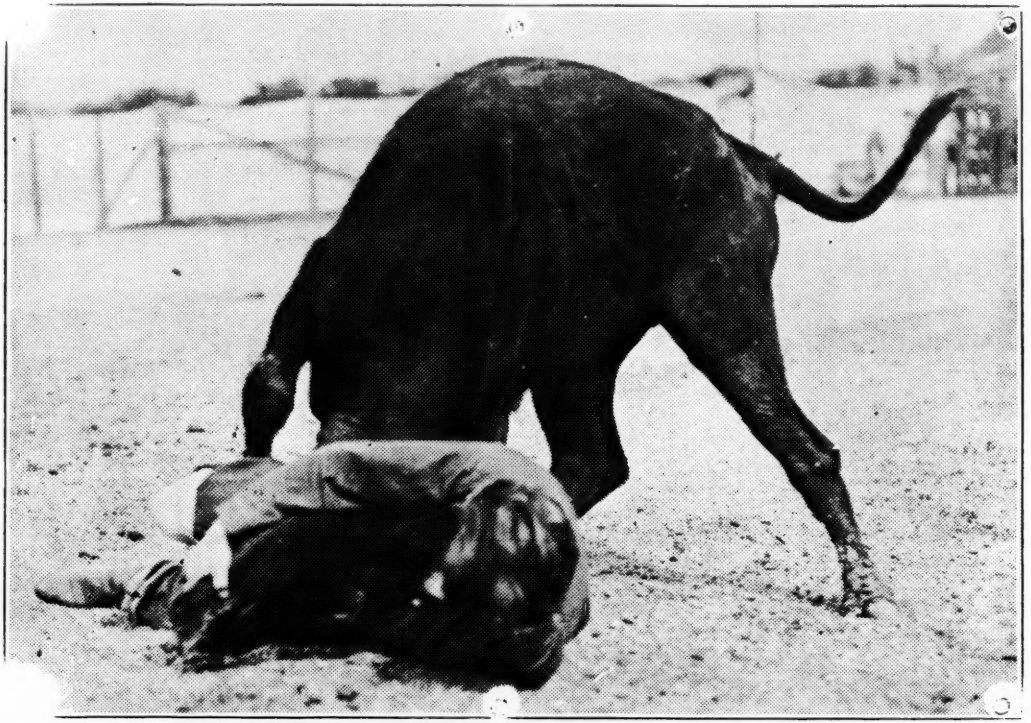
Lee S. Smith & Son, Pittsburgh, Pa.
Spyco Smelting & Refining Co., Minneapolis, Minn.
E. R. Squibb & Sons, New York, N. Y.
Sterile Products Co., San Diego, Calif.
I. Stern & Co., New York, N. Y.

Toledo Dental Supply Co., Toledo, Ohio.
Toledo Technical Appliance Co., Toledo, Ohio.

Victor X-Ray Corporation, Chicago, Ill.

Wappler Electric Co. Inc., Long Island City, N. Y.
S. S. White Dental Mfg. Co., Philadelphia, Pa.
H. B. Wiggins Sons, Bloomfield, N. J.
The Wilkinson Co., Santa Monica, Calif.
Wilmot Castle Co., Rochester, N. Y.

"HOLD HIM COW-BOY!"



At a Texas Rodeo, when a cow-boy ropes a calf, conquers a bucking horse or bull-dogs a steer, his fellows always yell, "Hold him Cow-boy!" to have him know that the bunch is behind him and expects him to sustain the cow-boy reputation.

That's what's happening with us, the local committee at Dallas right now. We've got the situation by the horns as to the meeting of the American Dental Association, which is to be held in Dallas, Nov. 10-14, 1924, and all Texas is telling us to "Hold him Cow-boy!"

# Announcements

## CALENDAR OF MEETINGS

### NATIONAL SOCIETIES

American Academy of Periodontology, October 7-9, 1924, Atlanta, Georgia.

American Association of Dental Schools, March, 1925, Chicago, Illinois.

American Dental Assistants' Association, November 10-14, 1924, Dallas, Texas.

American Dental Association, November 10-14, 1924, Dallas, Texas.

American Dental Trapshooters' Association, November 10, 1924, Dallas, Texas.

American Society of Dental Radiographers, November 7 and 8, 1924, Dallas, Texas.

American Society of Oral Surgeons and Exodontists, November 5-8, 1924, Adolphus Hotel, Dallas, Texas.

Delta Sigma Delta, November 10, 1924, Jefferson Hotel, Dallas, Texas.

Dental Protective Association of the United States, December 15, 1924, 4:00 p. m., Palmer House, Chicago, Illinois.

Federation of American Women Dentists, November 10-12, 1924, Dallas, Texas.

National Alumni Chapter, Psi Omega Fraternity, November 10, 1924, Southland Hotel, Dallas, Texas.

National Alumni Chapter, Xi Psi Phi Fraternity, November 10, 1924, Adolphus Hotel, Dallas, Texas.

National Association of Dental Examiners, November 10, 11, 1924, Dallas, Texas.

### STATE SOCIETIES

National Capital, at Washington, D. C., first Tuesday of every month.

September

Maryland, at Frederick (22-24).

October

New York Society of Orthodontists, New York City (8).

Susquehanna, at Wilkes-Barre (21-23).

November

American Dental Association, at Dallas (10, 11, 12, 13, 14).

Arizona, at Phoenix.

Texas at Dallas (10, 11, 12, 13, 14).

December

Ohio, at Dayton (2, 3, 4).

January (1925)

Chicago Dental Society, Chicago (21-23).

February (1925)

Minnesota, at Kenwood Armory, Minneapolis (10-13).

May (1925)

Missouri, Kansas City (11-13).

Pennsylvania, Reading (5-7).

### MEETINGS OF STATE BOARD OF DENTAL EXAMINERS

Connecticut, at Hartford, November 18-20, 1924. Recorder, Arthur B. Holmes, 43 Central Avenue, Waterbury, Connecticut.

Colorado, at Denver, December 2-6, 1924. Secretary, William H. Flint, Littleton, Colorado.

New Jersey, at Trenton, December 1, 1924. Secretary, John C. Forsyth, 429 E. State Street, Trenton, New Jersey.

### MISSOURI STATE DENTAL ASSOCIATION

The next meeting of the Missouri State Dental Association will be held in Kansas City, May 11-13, 1925.

H. C. POLLOCK, *Secretary,*
Metropolitan Bldg., St. Louis, Mo.

### PENNSYLVANIA STATE DENTAL SOCIETY

The next annual session of the Pennsylvania State Dental Society will be held at Reading, Pa., May 5-7, 1925. Dr. Leslie Waddill, Jenkins Arcade, Pittsburgh, is manager of exhibits.

For further information address

A. C. BARCLAY, *Recording Secretary,*
914-915 Highland Building,
Pittsburgh, Pa.



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## COLORADO STATE BOARD OF DENTAL EXAMINERS

The next semi-annual meeting of the Colorado State Board of Dental Examiners will be held in Denver, commencing, December 2, and continuing for five days. For further information, address

WILLIAM H. FLINT, *Secretary,*
Littleton, Colo.

## THE CONNECTICUT DENTAL COMMISSION

The Connecticut Dental Commission will meet at Hartford, Conn., Nov. 18-20, 1924, to examine applicants for license to practice dentistry and dental hygiene, and to transact any other business proper to come before them. For further information, apply to

ARTHUR B. HOLMES, *Recorder,*
43 Central Ave., Waterbury, Conn.

## THE AMERICAN SOCIETY OF DENTAL RADIOGRAPHERS

The annual meeting of the American Society of Dental Radiographers will be held at the Adolphus Hotel, Dallas, Texas, Friday and Saturday, November 7-8. All dentists interested in radiography are invited to attend.

ARNOTT A. MOORE, *President,*
131 Allen Street,
Buffalo, N. Y.
MARTIN DEWEY, *Secretary.*
501 Fifth Avenue,
New York City.

## AMERICAN SOCIETY OF ORAL SURGEONS AND EXODONTISTS

The sixth annual meeting of the American Society of Oral Surgeons and Exodontists will be held, November 5-8, at Dallas, Texas, in the roof garden of the Adolphus Hotel. Members of this society desiring detailed information regarding local arrangements will please write to

A. L. FREW, *Chairman,*
Local Arrangements Committee,
4105 Live Oak Street, Dallas, Texas.

## NATIONAL ALUMNI CHAPTER XI PSI PHI FRATERNITY

The National Alumni Chapter of the Xi Psi Phi Fraternity will hold its annual meeting and election of officers, Monday, Nov. 10, at 9 a. m., at the Adolphus Hotel. Important business will be transacted.

J. EMMETT NORTHCUTT, *Secretary-Treasurer,*
St. John and Elmwood Ave.,
Kansas City, Mo.

## NATIONAL ALUMNI CHAPTER OF THE PSI OMEGA FRATERNITY

The annual meeting of the National Alumni Chapter of the Psi Omega Fraternity will be held at the Southland Hotel, Dallas, Texas, Monday, November 10, 1924. The executive committee will meet at 10 a. m. The general meeting will start at 2 p. m. and everyone is urged to be on hand promptly. A stag banquet will be held at 7 p. m. Reservations must be made by 4 p. m. A big surprise is in store for those who attend.

LLOYD S. HUHN,
*Grand Master National Alumni Chapter,*
3166 Lincoln Avenue,
Chicago, Ill.

## THE DEFENSE TEST
### SEPTEMBER 12, 1924

The President of the United States has designated Sept. 12, 1924, the sixth anniversary of the Battle of St. Mihiel, as the day to commemorate the achievements of the American participation in the World War. A practical demonstration of the national progress in the fulfillment of the Defense program will be held on that day.

Human nature and the instinct of self-preservation are the same today as in ages past. Wars will occur, however much we deplore them. Our history shows that unpreparedness at the beginning of every war, none excepted, has necessitated a reckless expenditure of money, materials and personnel. At the beginning of these emergencies the cost was not considered: we had to act and to act quickly. "Win the war" was the one purpose and all others were made subordinate thereto. The delay, confusion, duplication of effort, inefficiency and expense, bred by lack of foresight and preparation, both during and after each emergency, have imposed heavily on every citizen, and the price has been paid by all.

Profiting by our past experiences, Congress has enacted a National Defense Act. The law provides that it shall be the duty of the War Department "to prepare plans for national defense and the use of the military forces for that purpose . . . . and for the mobilization of the manhood of the nation and its material resources in an emergency . . . . "

The War Department, after months of work, has progressed to a point where it is desirable to "take stock." It is obvious that plans, covering the many details relative to personnel, equipment, hospital and sanitary services, and other questions directly affecting the life and prosperity of every citizen, must

be revised more than once before they have reached a satisfactory stage. Sept. 12, 1924, has accordingly been fixed on as the date to analyze our defense plans and enable the War Department to apply remedies where indicated. The plans are not secret, because the methods of organization and the success of the system require a full understanding by the people, and the cooperation of communities and the voluntary action of individuals.

The Defense Test will be a demonstration of the Army's mobilization plans to the Army's owners, the citizens of the United States of America. The proposition is to call a meeting of the stockholders, September 12, such as the Board of Directors of every business concern calls from time to time, and inform the American people of the plans and methods by which American armies will be raised and maintained in the event of a future national emergency. This can be done without fear or prejudice, because we have no hostile purpose toward any nation or people.

The defense test will be simply the assembling of the Regular Army, the National Guard, and the Organized Reserves in their home communities, in much the same manner our forefathers did in the American Revolution. It will introduce to our people the new Army of the United States, and will impress on them the fact that it is theirs and will be ready for whatever expansion there is needed to meet any particular emergency.

The people will see that the Army in its skeleton form, consists of divisions that served during the World War, and that they belong to the various states and sections which contributed the largest numbers of them during the conflict. The people should know that the nation's defense plans rest primarily upon community effort; that the means of protection has been equally and equitably distributed among all communities; that each will be called on to perform a given task; that each shall know what that task will be, and that each shall feel a sense of pride in the Army as a whole and of ownership and pride in the units to be supported by them.

In addition to this, each individual officer, man and nurse will be impressed with his particular function if war comes. The idea is to suggest to officers their respective duties, enabling them to visualize the problem for themselves and thus avoid, should the emergency come, the confusion and the lost motion before we can get under way.

The Organized Reserves will constitute the great bulk of our citizen army in a national emergency. The Test will consequently mean much to Reserve officers and to the Army component represented by them. It brings before them the necessity for a working knowledge of their duties in the event of a real mobilization, questions of recruiting, shelter, equipment, supply, sanitary measures, training and other essentials in mobilization. The necessity for the whole-hearted and active interest of Reserve officers in this project cannot be overemphasized.

At the present time, there are more than 3,200 dentists in the United States holding commissions in the Dental Officers' Reserve Corps, and Dental Corps of the National Guard, distributed in the various grades from First Lieutenant to Colonel, respectively, all of whom will be notified directly or through the local press of the activity expected of them on that day.

Those of our profession who have not yet enrolled in the Reserve are also earnestly urged to participate in the Defense Test and community patriotic demonstrations which will be held, Sept. 12, 1924.

## NOTICE

### POLK'S DENTAL REGISTER AND DIRECTORY OF THE UNITED STATES AND CANADA

The publishers have sent a questionnaire to every dentist whose name could be secured, including the 3,511 who have graduated within the past two months. It is seven years since the last dental register appeared, and since then there have been graduated more than 22,000 dentists, whose names have never appeared in a dental register.

This book has always been of great value to the dental profession, to editors, to publishers, to the dental trade and to all who are in any way interested in the progress of dentistry. A reliable, up-to-date list of dentists, with the additional information which this publication has always presented is an urgent necessity.

It is manifestly impossible for anyone to compile such a work, to make it complete, reliable and of value to the dentist, without the prompt cooperation of every dental practitioner. It is of great importance and value to the dentist himself that his name and address appear correctly in the register. The dentist assumes no obligation whatever. Unless the questionnaire is returned, the publisher must omit the name. The profession is urged to cooperate to the fullest extent by filling out the blank (which takes but a few moments), without loss of time and mailing it to R. L. Polk & Co., 536 S. Clark St., Chicago. A return envelope is supplied for this purpose.

Any dentist who has not received a questionnaire is urgently requested to send in his name and address, and a blank form will be sent to him. The important point is *prompt*

*action,* which will enable the publishers to do each dentist justice by recording full and correct information concerning him.

## ARMISTICE DAY, 1924

For the first time since the Great War, the American Dental Association will be in session, November 11, Armistice Day.

Many of our members saw active service in the Great War, and many who were not in the service, did their part in numerous organizations acting in support of the Army, during the strenuous period.

Unfortunately, we did not bring back with us all of the men whom we took away. So, in memory of those who were killed in action, and those who died in camp and those others who did not return, it would be most fitting for all the members of the Association who have been in the military service of the United States at any time to wear their uniforms during the entire session of the American Dental Association, November 11, 1924. Get your old uniform out and try it on, and if you have become too great a strain on the buttons, train down between now and next November. When you come to the association meeting at Dallas, be sure you pack your uniform first and everything else afterward.

This will be a great opportunity for us to show the Association and the citizens of Dallas that the dentist was there when needed.

The complete list of dentists of the Army and Navy who were killed in action or died of wounds, disease, accident and other causes, during the war is given from the record of the War Department.

Following is the complete list of dental officers who were killed in action or died of wounds, and those who died of disease, accident or other cause:

### In Memoriam

*Officers of the Dental Corps Killed in Action* (Army)

Ambelang, Lisle P.—First Lieutenant, Dental corps, Aug. 6, 1918; killed while serving with the 125th Infantry, American Expeditionary Forces, France.

Desmond, Walter P.—First Lieutenant, Dental Corps, July 19, 1918; killed while serving with the 38th Infantry, American Expeditionary Forces, France.

Morrissey, Howard M.—First Lieutenant, Dental Corps, Nov. 1, 1918; killed while serving with the 360th Infantry, American Expeditionary Forces, France.

Parsons, Joseph H.—First Lieutenant, Dental Corps, Oct. 4, 1918; killed while serving with the 313th Machine Gun Battalion, American Expeditionary Forces, France.

Stone, Leslie A.—First Lieutenant, Dental Corps, Oct. 17, 1918; killed while serving with the 103rd Infantry, American Expeditionary Forces, France.

*Officers of the Dental Corps Who Died of Disease, Accident or Other Causes* (Army)

Augenstein, Melvin M.—Captain, Dental Corps, Oct. 9, 1918; American Expeditionary Forces, France.

Ballachey, Frederic A.—First Lieutenant, Dental Corps, Sept. 26, 1918; Camp Dix, N. J.

Baris, Alexander D.—First Lieutenant, Dental Corps, Feb. 28, 1919; American Expeditionary Forces, France.

Birdsong, Horace R.—First Lieutenant, Dental Corps, May 10, 1918; Camp Mills, N. Y.

Bliss, Vance W.—First Lieutenant, Dental Corps, Oct. 12, 1918; American Expeditionary Forces, France.

Boazman, Francis E.—First Lieutenant, Dental Corps, Oct. 19, 1918; Camp Sherman, Ohio.

Boisseau, Charles H.—First Lieutenant, Dental Corps, Oct. 12, 1918; Camp Upton, Long Island, N. Y.

Earley, Joseph R.—First Lieutenant, Dental Corps, Oct. 8, 1918; Camp Stuart, Va.

Fickes, Ralph H.—First Lieutenant, Dental Corps, Oct. 18, 1918; Fort Oglethorpe, Ga.

Fleming, Lionel G.—First Lieutenant, Dental Corps, Oct. 4, 1918; Camp Lee, Va.

Fletcher, Roland E.—First Lieutenant, Dental Corps, Dec. 21, 1918; Fort Oglethorpe, Ga.

Friday, Gale—First Lieutenant, Dental Corps, Nov. 14, 1918; Camp Sheridan, Ala.

Glass, Roy S.—First Lieutenant, Dental Corps, Oct. 19, 1918; Frackville, Pa.

Grandage, Walter—Captain, Dental Corps, Oct. 7, 1918; Camp Devens, Mass.

Hannah, Clark B.—First Lieutenant, Dental Corps, Oct. 18, 1918; Camp Fremont, Calif.

Henshaw, Winfred E.—First Lieutenant, Dental Corps, Sept. 28, 1918; Chicago, Ill.

Hoffman, Wade H.—First Lieutenant, Dental Corps, Oct. 14, 1918; Camp Upton, Long Island, N. Y.

Jones, Alexander H.—First Lieutenant, Dental Corps, Oct. 1, 1918; American Expeditionary Forces, France.

Jones, Earl P.—Captain, Dental Corps, March 3, 1919; American Expeditionary Forces, France.

Kreitman, Albert L.—First Lieutenant, Dental Corps, Oct. 4, 1918; Camp Meade, Md.

Laid, Harry B.—Captain, Dental Corps, May 5, 1919; Fort Sill, Okla.

Leonard, Frank S.—First Lieutenant, Dental Corps, Jan. 13, 1919; American Expeditionary Forces, France.

Lubiyz, Wm. M.—First Lieutenant, Dental Corps, Oct. 11, 1918; Camp Dix, N. J.

Mattox, Geo. W.—First Lieutenant, Dental

Corps, Oct. 15, 1918; American Expeditionary Forces, France.

Moffett, Samuel F.—First Lieutenant, Dental Corps, Jan. 16, 1919; Fort Bliss, Texas.

Morin, Adrain—First Lieutenant, Dental Corps, Oct. 18, 1918; Camp Fremont, Calif.

Neal, Max—Captain, Dental Corps, March 16, 1919; American Expeditionary Forces, France.

Niles, Will C.—First Lieutenant, Dental Corps, Oct. 4, 1918; Boston, Mass.

Patterson, Loy A.—First Lieutenant, Dental Corps, July 19, 1918; Camp Beauregard, La.

Peterson, Walter F.—First Lieutenant, Dental Corps, Sept. 6, 1918; Camp Custer, Mich.

Postle, Merton M.—Major, Dental Corps, October 15, 1918; Camp Taylor, Ky.

Reinhard, Walter O.—First Lieutenant, Dental Corps, Oct. 3, 1918; Camp Custer, Mich.

Sanderson, Mortimer—Lieutenant Colonel, Dental Corps, July 30, 1918; Camp Cody, N. Mex.

Simm, Francis R.—First Lieutenant, Dental Corps, Oct. 17, 1918; Fort Oglethorpe, Ga.

Simons, John S.—First Lieutenant, Dental Corps, Oct. 2, 1918; Camp Tobyhanna, Pa.

Smith, Cecil C.—First Lieutenant, Dental Corps, Oct. 18, 1918; Camp Travis, Texas.

Staples, Bernard F.—First Lieutenant, Dental Corps, Sept. 24, 1918; Camp Devens, Mass.

Stocker, Delmar H.—First Lieutenant, Dental Corps, Oct. 3, 1918; American Expeditionary Forces, France.

Wald, Alfred G.—First Lieutenant, Dental Corps, Oct. 15, 1918; Camp Jackson, S. C.

Walker, Raymond A.—First Lieutenant, Dental Corps, Sept. 28, 1918; Camp Devens, Mass.

Wall, Harrison B.—Captain, Dental Corps, March 28, 1918; Camp Custer, Mich.

Wilcox, Geo. E.—First Lieutenant, Dental Corps, Sept. 28, 1918; Southampton, England.

Wilhite, Fielding M.—Captain, Dental Corps, April 24, 1919; Fort Riley, Kan.

Zwink Edwin B.—First Lieutenant, Dental Corps, Nov. 7, 1918; Camp Cody, N. M.

*Officers of the Dental Corps Who Died Before Being Called into Active Service*

(Army)

Allison, Lester J.—First Lieutenant, Dental Reserve Corps, April 20, 1918; Iowa City, Iowa.

Casselman, Ernst L.—First Lieutenant, Dental Reserve Corps, Nov. 15, 1918; Effingham, Ill.

Duwe, Harry E.—First Lieutenant, Dental Reserve Corps, Oct. 28, 1918; Arlington, Iowa.

Hanson, Roy E.—First Lieutenant, Dental Reserve Corps, Nov. 25, 1918; Cambridge Springs, Pa.

Henry, Carl R.—First Lieutenant, Dental Reserve Corps, Sept. 4, 1917; Cuba, Ill.

Higgins, John C.—First Lieutenant, Dental Reserve Corps, Oct. 18, 1918; McAdoo, Pa.

Osborne, Lloyd A.—First Lieutenant, Dental Reserve Corps, July 24, 1918; Fremont, Iowa.

Weidert, Raymond M.—First Lieutenant, Dental Reserve Corps, Nov. 7, 1918; Wilcox, Pa.

This data is taken from "The Medical Department of the United States in the World War" Vol. 1, 1923. The list of officers who died during the war include those dying up to September 1, 1919, only. It was prepared from the records of the Surgeon General's Office, and checked by the records of the Adjutant General's Office.

Officers of the Dental Corps, United States Navy, who died between April 5, 1917 and Nov. 11, 1918:

*Killed in Action*

Osborn, Weeden Edward.—Dental Surgeon, U. S. Navy, June 6, 1918, while serving with Sixth Regiment, U. S. Marine Corps.

*Died of Disease*

Feely, James Francis—Lieutenant (junior grade), Dental Corps, U.S.N.R.F., Sept. 26, 1918; U. S. Naval Hospital, Newport, R. I.

King, James Lewin, Lieutenant (junior grade), Dental Corps, U.S.N.R.F., Oct. 1, 1918; Naval Base, Norfolk, Va.

Rehm, Arthur Alfred—Lieutenant-Commander, Dental Corps, U. S. Navy, Oct. 20, 1918; U. S. Naval Hospital, Washington, D. C.

Schmid, Karl Earnest—Lieutenant (junior grade), Dental Corps, U.S.N.R.F., Oct. 9, 1918; U. S. Naval Hospital, Pelham Bay Park, New York.

Young, Roy Arthur—Lieutenant (junior grade), Dental Corps, U.S.N.R.F., Oct. 4, 1918; Claremont, N. H.

REA PROCTOR MCGEE,
*Colonel, D. O. R. C.*

## ATTENTION! GOLFERS

To A. D. A. Golfers and
Those Who intend to Become Golfers:

A splendid golf program has been arranged for all who attend the Dallas meeting of the American Dental Association, and are interested in the great game. The officers of the American Dental Golf Association, the Golfers of Dallas and Texas, cordially invite you to come to this meeting and enjoy some of the best golf you have ever had. Five fine courses in Dallas and two or three in Ft. Worth (30 miles away) will be open to our visitors at all times, and you are welcome to use them at your pleasure.

Cards to all the clubs will be provided for our members, and for those who join before or during the meeting.

We are planning for, and looking forward to

the largest and best meeting and tournament we have ever had. We realize that this is a big undertaking, but we confidently hope to make our prophesy good. Come and let us show you.

OUR GOLF PROGRAM

(*Subject to Revision*)

Dinner—(Don't miss it). Sunday night, Nov. 9, 1924, 7 p. m., Adolphus Hotel.

Tournament. Dallas Country Club and Lakewood Country Club, Monday, Nov. 10, 1924, tee off 7:30 a. m.

18 hole medal handicap—Class C and runner up.

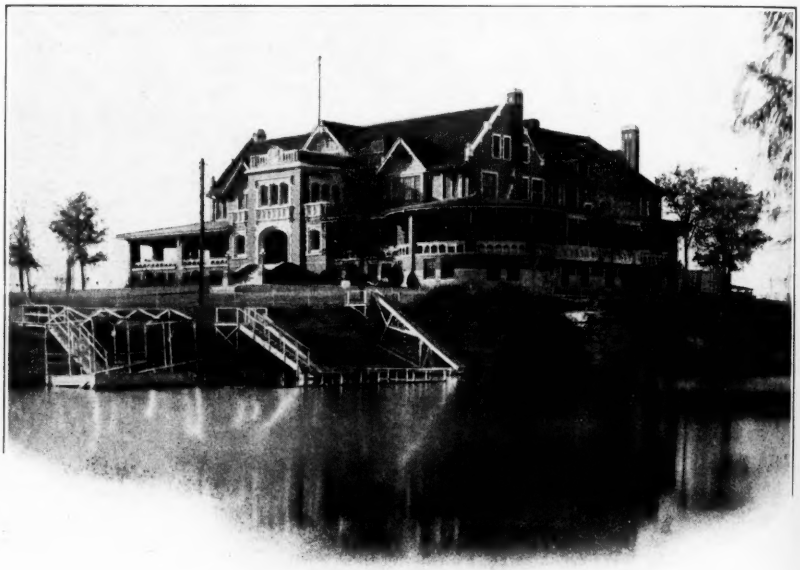
18 hole medal handicap—Class D and runner up.

18 hole low gross.

For each Class A, B, C, D and runner up to each event.

Also other special events and prizes.

Saturday, Nov. 15, 1924, an invitation tournament will be given in Ft. Worth to the visiting golfers who will stay over. The details are not yet arranged, but a big time is promised.



Dallas Country Club

The Play:

1. American Dental Golf Association *Championship*. 36 holes medal play and runner up. Championship cup presented by City of Dallas.

2. American Dental Golf Association—"Handicap" (or low net). 36 holes play, less handicap. 36 holes and runner up. "Handicap" Cup presented by The A. P. Cary Company, Dallas.

Other features include:

18 hole medal handicap—Class A and runner up.

18 hole medal handicap—Class B and runner up.

The local committee in Dallas are: Perry Baird, Chairman, Wilson Building; A. L. Nygard, Medical Arts Building; W. P. Delafield, Medical Arts Building; A. B. Conly, Medical Arts Building, and A. L. Frew, Live Oak and Haskel.

For any local information, a letter addressed to any of the committee will receive prompt and courteous attention.

To golfers, who do not as yet belong to the American Dental Golf Association: We would like very much to have you join us. Requirements: Membership in the American Dental Association; the ability to "shoot" 18 holes in from 65 to 187, and your application with three

dollars ($3.00), which entitles you to a life membership—*without dues*—and the association of the finest bunch of fellows you ever met. Send in your application immediately to Dr. J. O. Hall, *Secretary-Treasurer*, 1101-02 Amicable Building, Waco, Texas, or to Dr. James A. Loughry, *President*, 1636 Keith Building, Cleveland, Ohio.

## SOUTHERN CALIFORNIA DENTAL GOLF CLUB

The annual golf tournament in conjunction with the Southern California Dental Association meeting was held at Coronado Country Club at San Diego, Calif., June 23, 1924. A Calcutta Pool and dinner was held, Sunday evening, June 22, with everybody having a good time and in a very receptive mood. The results of the tournament were:

| | | |
|---|---|---|
| Low gross 18 holes a.m. | W. H. Spinks | 82 |
| Low net 18 holes a.m. | E. V. Rice | 69 |
| Low gross 18 holes p.m. | L. D. Jones | 71 |
| Low net 18 holes p.m. | S. E. Watson | 83 |
| Low gross 36 holes | E. K. Patton | 142 |
| Low net 36 holes | S. E. Watson<br>C. G. Hartley tied | 163 |
| | C. G. Hartley won on play off | 77 |
| Best 18 out of 36: | F. M. Taylor | 84 |
| Match play against par | F. W. Seidel | |
| Most sixes | Guy Bailey | |

The results of the ladies' putting contest, 18 holes, at Miniature Course, Coronado Hotel were:

| | |
|---|---|
| Mrs. L. E. Ford | 60 |
| Mrs. E. R. Kibbler | 63 |
| Mrs. R. R. Hartley | 66 |
| Mrs. E. H. Lyman | 69 |
| Mrs. F. E. Hogeboom | 78 |
| Mrs. J. W. Gray | 88 |
| Mrs. L. A. Frasher | 92 |
| Mrs. Chas. Hartley | 94 |
| Mrs. Frank Kaiser | 95 |

Miniature Golf Course at Hotel Del Coronado: Annual Golf Tournament of the Southern California Dental Golf Club, June 24-26, 1924

Mrs. Ford won the prize given by the Coronado Hotel.

The annual golf dinner was held at the Coronado Hotel at 7 p. m., with 400 in the banquet room. Dr. Frank Giguette acted as toastmaster. After talks from the silver tongued orators of the Golden West, the prizes were distributed, and everybody felt well repaid in the evening's entertainment.

If any of our eastern dentists at any time should come to Southern California, kindly let

us know, and we will have a golf tournament waiting for them in addition to the Long Beach fishing trip.

FRED D. SCHILDWACHTER,
*Chairman of the Publicity Committee,*
Security Bldg., Los Angeles, Calif.

## FIRST ANNUAL SHOOT OF AMERICAN DENTAL TRAPSHOOTERS' LEAGUE

The first annual tournament of the American Dental Trapshooters' League was held at Cleveland, Ohio, Sept. 10, 1923.

Dr. J. P. Henahan, chairman of the Entertainment Committee of the American Dental Association, 1923, Dr. A. I. Brown and Dr. W. C. Hood, all of Cleveland, took charge of the local arrangements.

Mr. Luther J. Squire, of the Dupont Powder Company, Wilmington, Del., was in charge of the office, and Mr. John R. Taylor of the Winchester Company was to assist Mr. Squire, but was called home by the death of his father.

Considering that this was the first shoot held by the Association, the attendance was very gratifying. Indications are that there will be a much larger attendance at Dallas, Texas, in November, 1924.

At the conclusion of the tournament, the following officers were elected for the ensuing year (1924): president, Dr. F. C. McGaughy, Galion, Ohio; vice president, Dr. W. I. Brown, Cleveland, Ohio; secretary, Dr. F. P. Leonard, Bucyrus, Ohio.

The prizes donated were all valuable, and I wish, in behalf of the association, to thank all those who helped in making the shoot a success, and also to thank the Dupont Company and the Winchester Company for their cooperation throughout the year.

C. W. MILLS, *Secretary, 1923,*
Chillicothe, Ohio.

**SCORES**

| Twenty-five bird events | First 25 | Second 25 | Third 25 | Fourth 25 | Total 100 |
|---|---|---|---|---|---|
| M. L. Ward | 14 | 22 | 17 | 23 | 76 |
| C. W. Mills | 22 | 22 | 20 | 21 | 85 |
| F. W. Everist | 17 | 17 | 16 | 9 | 59 |
| A. I. Brown | 21 | 20 | 20 | 19 | 80 |
| W. H. Conklin | 20 | 20 | 21 | 21 | 82 |
| Theo. Blum | 13 | 14 | 15 | 11 | 53 |
| F. C. McGaughy | 13 | 14 | 14 | 14 | 55 |
| F. P. Leonard | 22 | 18 | 15 | 21 | 76 |
| J. L. Bell | 11 | 20 | 13 | 15 | 59 |
| R. B. Clugh | 17 | 14 | 18 | 14 | 63 |
| C. H. Sellars | 17 | 17 | 17 | 18 | 69 |
| W. G. Hood | 10 | 15 | 17 | 15 | 57 |
| F. A. Coburn | 9 | 13 | 16 | 15 | 53 |
| G. H. Williamson | 15 | 13 | 16 | 12 | 56 |
| W. H. Hayden | 10 | xx | 5 | | |
| J. M. McMinn | 12 | 19 | 13 | 14 | 58 |
| F. R. VanMeter | 18 | 17 | 11 | 12 | 58 |
| J. H. Balsiger | 18 | 16 | 16 | 17 | 67 |
| J. F. Keiser | 18 | 20 | 15 | 17 | 70 |
| H. Avary | xx | 5 | | | |
| R. C. Seibert | xx | xx | 16 | 14 | |
| O. J. Fruth | xx | xx | 0 | | |

Long runs—(1) Mills ..... 18
(2) Ward ..... 16
(3) Conklin ..... 15
(4) Brown ..... 13

Low score—(1) Blum ..... 53
(2) Colburn ..... 53
(3) McGaughy 55

Owing to the number of prizes donated, the total of 100 birds was divided into one race of 100 birds with six prizes; four races of twenty-five birds with five prizes (class shooting); two races of fifty birds with four prizes (class shooting); long runs, four prizes; low score three prizes.

Below is given in detail the different events and the number of the prize given each contestant for his position in the race:

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 100 birds | 28-35 | 12 | 2 | 9 | 15 | 8 |
| 1st 25 " | 27 | 14 | 30 | 13 | 7 | |
| 2nd 25 " | 23 | 6 | 31 | 26 | 18 | |
| 3rd 25 " | 36 | 19 | 17 | 38 | 22 | |
| 4th 25 " | 3 | 5 | 29 | 39 | 24 | |
| 1st 50 " | 21 | 1 | 37 | 10 | | |
| 2nd 50 " | 20 | 11 | 4 | 34 | | |
| Long run | 41 | 40 | 33 | 42 | | |
| Low score | 25 | 33 | 16 | | | |

By referring to the list of prizes and their respective numbers, the detail of the different events as shown above will show the winners of the various prizes.

High score in total 100 birds was awarded the Rich Alloy No. 35, emblematic of the championship for 1923 and the Lavoris Cup, No. 28, which is to be the property of the contestant winning it three times.

## SECOND ANNUAL SHOOT OF AMERICAN DENTAL TRAPSHOOTERS' LEAGUE

The second annual shoot of the Trap-Shooters' League of the American Dental Association will be held at the Dallas Gun Club Grounds, Monday, November 10, 1 p. m.

Arrangements have been made for practice shooting at 10 a. m.

The program will consist of a hundred bird race of four events of twenty-five birds each, followed by a fifty bird handicap. Shooters will be handicapped according to standing in the hundred bird race.

Suitable prizes have been arranged, cups and merchandise.

The Lavoris Cup won at Cleveland last year by Dr. Charles Mills, Chillicothe, Ohio, has to be won three times before it can be retained by any shooter. We want all shooters

to be on hand to help pry Mills loose from this cup.

Meet us in Dallas.

F. C. McGAUGHY, *President*,
Galion, Ohio.

F. P. LEONARD, *Secretary*,
Bucyrus, Ohio.

E. L. KNOX, *Chairman*,
Local Committee, Dallas, Texas.

## PRIZES DONATED FOR AMERICAN DENTAL TRAPSHOOTERS' LEAGUE TOURNAMENT

No. 1. The Antidolor Mfg. Co., Springville, N. Y.—Complete nerve-blocking outfit with complete nerve-blocking book of instructions.

No. 2. Blue Island Specialty Co., Blue Island, Ill., Revolving bur stand with assortment of excavating burs.

No. 3. A. A. Brown Dental Mfg. Co., St. Louis, Mo.—One dozen boxes Neo-Balsam Compound.

No. 4. The Engeln Electric Co., Cleveland, Ohio.—Blum Binocular Dentascope.

No. 5. The W. V.-B. Ames Co., Fremont, Ohio.—$15.00 package Ames Crown & Bridge Cement.

No. 6. The Hugo Friedman Co., Chicago, Ill.—Set of eight prophylactic scalers, one knife and a "Henahan elevator."

No. 7. Friedman Specialty Co., Chicago, Ill.—One skull ink well, one fracture set.

No. 8. Toledo Dental Supply Co., Toledo, Ohio.—One gross Diamond burs, well assorted; one bottle Diamond Deodorizer and sprayer.

No. 9. The Ranson & Randolph Co., Cleveland, Ohio.—One gross Cutwell Burs in Turret Case.

No. 10. The Abbott Laboratories, Chicago, Ill.—Five popular dental items in plush lined case.

No. 11. Novocol Chemical Mfg. Co., Inc., Brooklyn, N. Y.—Ten tubes Novol Procain Tablets, No. 1; one Novol Ringer Flask; one tube Novesthol Paste; one bottle Novesthol Liquid; one bottle Validol (Novol); one tube Bromural Tablets.

No. 12. Columbia X-Ray & Electric Corp., New York City.—Columbia Electric Pulp Tester.

No. 13. Kress & Owen Co., New York City.—Hospital size bottle Glyco-Thymoline.

No. 14. Cleveland Dental Mfg. Co., Cleveland, Ohio.—One set 16 Crandall Amalgam Condensers.

No. 15. Frank S. Betz Co., Hammond, Ind.—One Brandeis Crown Slitter.

No. 16. Colgate & Co., New York City—One men's gift box.

No. 17. Thwaites X-Ray Co., Grand Rapids, Mich.—One gross roentgen-ray films.

No. 18. Curry Hand-Piece Protector Co., Baltimore, Md.—Outfit of curry hand-piece protectors and glass container for same.

No. 19. Lee S. Smith & Son Mfg. Co., Pittsburgh, Pa.—One pair porcelain enamel chair arms (Forsyth type).

No. 20. Anonymous—One $50.00 cabinet new filling porcelain.

No. 21. J. W. Ivory, Philadelphia, Pa.—Set of ivory clamps in oak case.

No. 22. Manhattan Coat Factory, Chicago, Ill.—One poplin garment, made to order.

No. 23. The L. D. Caulk Co., Milford, Del.—One ten shade full portion package of DeTrey's Synthetic Porcelain.

No. 24. The Heidbrink Co., Minneapolis, Minn.—Set of bite blocks and set of mouth props.

No. 25. Brophy Dental Mfg. Co., Chicago, Ill.—One set window casting ring.

No. 26. Industrial Rubber Corporation, Long Island City, N. Y.—One dozen Cleanlyke Caps and Discs.

No. 27. Union Dental Instrument Mfg. Co., Philadelphia, Pa.—Set of eighteen Udimcolite instruments.

No. 28. Lavoris Chemical Co., Minneapolis, Minn.—Cup, to be the property of the contestant winning it three times.

No. 29. Corega Chemical Co. Cleveland, Ohio.—Order for merchandise to the value of $25.

No. 30. The Alkalol Co., Taunton, Mass.—Hospital size bottle Alkalol.

No. 31. The Halle Bros. Co., Cleveland, Ohio.—Prize to be selected.

No. 32. The Electro Dental Mfg. Co., Philadelphia, Pa.—Electro-dental water heater.

No. 33. The May Co., Cleveland. Ohio.—$5.00 merchandise bond.

No. 34. Thomas J. Dee & Co., Chicago, Ill.—Five ounces of Dee Alloy.

No. 35. The Rich-Alloy Co., Cleveland, Ohio.—American beauty vase made especially by Roycrofters (for 1923 Championship).

No. 36. The Teter Mfg. Co., Cleveland, Ohio.—One cowhide bag.

No. 37. The Kline & Kothe Co., Cleveland, Ohio.—Six Color box of Ames C & B Cement.

No. 38. The Pepsodent Co., Chicago, Ill.—Gold plated pocket style decoater and refill.

No. 39. H. A. Metz Laboratories, Inc., New York City.—Supplies.

No. 40. Cameron Surgical Specialty Co., Chicago, Ill.—Dentalamp.

No. 41. Spyco Smelting & Refining Co., Minneapolis, Minn.—One ounce Tinker Gold.

No. 42. Harmeyer & Brand, Cincinnati, Ohio.—Lilly's Pyorrhea solution.

# AMERICAN DENTAL ASSOCIATION

## SIXTY-SIXTH SESSION

## DALLAS, TEXAS, NOVEMBER 10-14, 1924

## HOTEL RESERVATIONS

In securing hotel reservations for the coming convention, consult the hotel rate-sheet and fill out the blank application below. Mail it *immediately* to the *hotel* of your choice. The hotel will then advise you of the reservation it has made for you.

KEEP THIS REMINDER OF YOUR RESERVATION

Hotel Selected .....

No. of Rooms .....

No. of Persons .....

Date of Reservation .....1924.

Detach here and keep for reference

---

## MAIL THIS APPLICATION DIRECT TO HOTEL

## HOTEL RESERVATION

### American Dental Association, Dallas, Texas, November 10-14, 1924

.....HOTEL ..... 1924
Dallas, Texas

*Please reserve for me the following:*

.....Room(s) with bath for.....people. Rate desired $.....
(per day)

.....Room(s) without bath for.....people. Rate desired $.....
(per day)

I hereby agree to pay for rooms described from morning / evening of November.....to November ....., unless cancellation is made by October 20, 1924.

*List names and addresses of all who will occupy room with you.*

Name ..... Address .....
Street, City and State

Name ..... Address .....
Street, City and State

Name ..... Address .....
Street, City and State

Name .....

Street .....

City ..... State .....

# HOTEL ROOM RATES—DALLAS

| HOTEL | ROOM WITH BATH | | ROOM WITHOUT BATH | |
|---|---|---|---|---|
| | One Person per day | Two Persons per day | One Person per day | Two Persons per day |
| ADOLPHUS<br>Akard and Commerce Sts. | 2.50-7.00 | 5.00-10.00 | 2.50- | 4.00- |
| JEFFERSON<br>Opp. Union Station | 2.50-3.00 | 4.00- 8.00 | 1.50- | 3 00- |
| MELROSE COURT* | 5.00-7.50 | 7.50-10.00 | | |
| SOUTHLAND<br>Main and Murphy Sts. | 2.50-3.00 | 3.00- | 1.50-3.00 | 3.00- |
| ST. GEORGE<br>1012 Main St. | 2.00-3.00 | 4.00- 6.00 | 1.00-1.50 | 2.00-3.00 |
| WALDORF<br>1302 Commerce St. | 3.00-3.50 | 4.00- 6.00 | 1.25-2.00 | 2.50- |
| MILAM<br>2013 Main St. | 2.50- | 3.50- | 1.50- | 2.50- |

Members are requested to procure roommates, especially those members from the larger centers, who are requested to go four or five in a large room. By so doing they will get better rooms.

FRATERNITY HEADQUARTERS

| | |
|---|---|
| XI PSI PHI, | ADOLPHUS HOTEL |
| DELTA SIGMA DELTA, | JEFFERSON HOTEL |
| PSI OMEGA, | SOUTHLAND HOTEL |

*Two connecting rooms, singles, $10.00-15.00; doubles, $4.00-6.00 per person; three persons to each room, $3.00-4.00 per person. Melrose Court is fifteen minutes' ride from the business center.

# *The Year-After-Year Return*

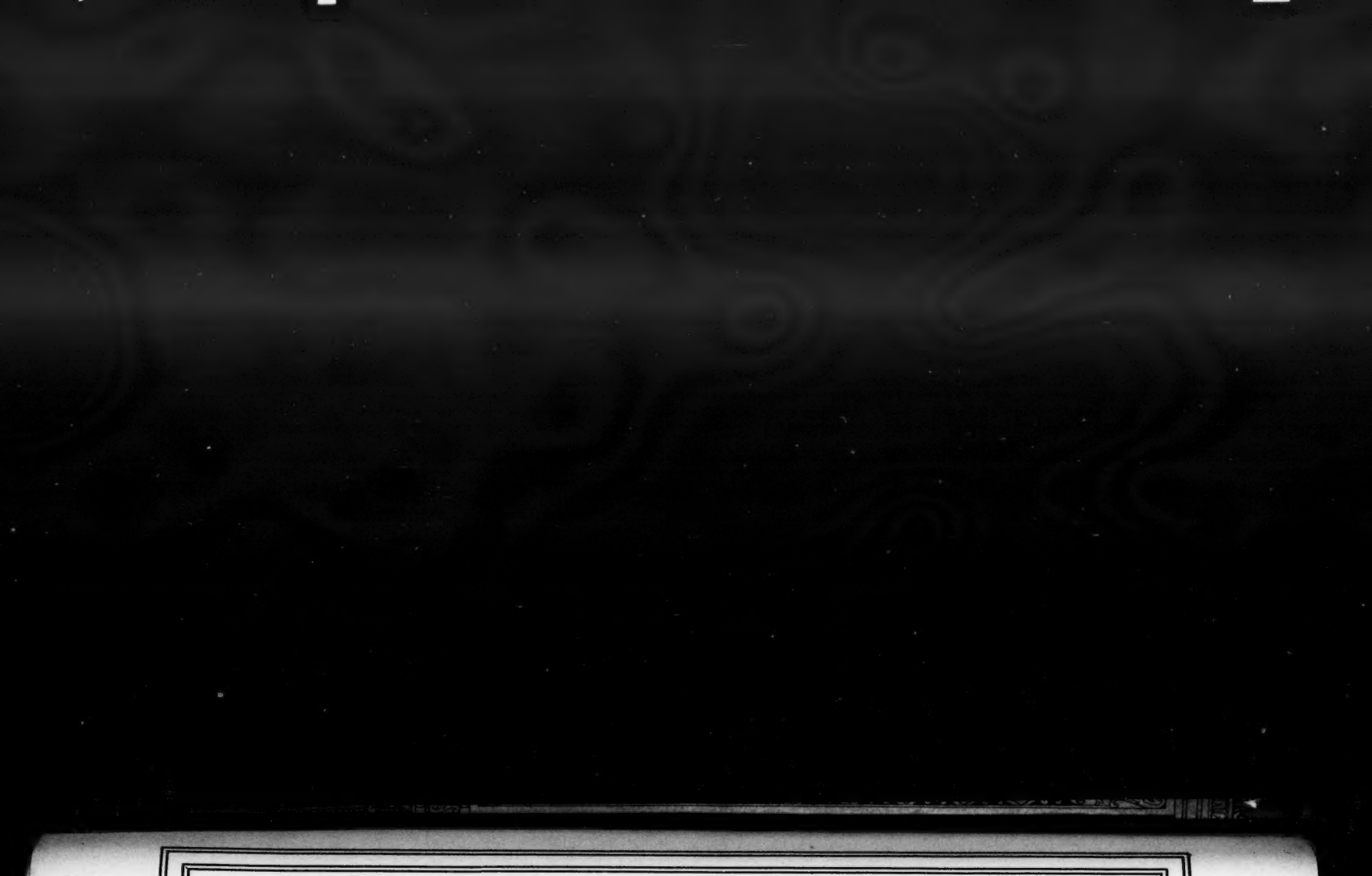
By ERNEST V. MADISON

IT is a day in December. The wind sweeps through the streets. The window panes seem to be mere conductors for cold air. We cannot get home because the street cars are stalled by the blizzard. So we turn to our neighbor at desk, machine or counter and say. *"Whew! This is regular Alaskan weather."*

Always the Alaska of the popular mind has been the home of old Boreas and intense cold, and the scene of a dramatic gold rush. Because the milder climates and enormous undeveloped resources of sections of this territory were unknown for a long time a single company had no competition in harvesting its wealth.

Under United States ownership, Alaska has paid a yearly return of more than its purchase price. In a single ten months, $14,500,000 in gold alone was imported into the United States—more than twice the amount we paid for the territory. Other imports from her soil and waters brought the total up to almost $81,875,000. The return of more than eighty-one million dollars is eleven times the purchase price—a worthwhile year-by-year return.

Just as the purchase money invested in Alaska brings a large year-after-year return to the United States, so does money invested in advertising in this journal bring year-after-year dividends—to both the advertisers and their customers.

The advertisements in *The Journal of The American Dental Association* influence readers to become customers of the advertiser. Their patronage calls for a larger production, which in turn lowers the cost of making per article, enabling the advertiser to sell at a lower cost—a year-after-year return to his customers.

The advertiser wants to hold the customers that his advertising in *The Journal of the American Dental Association* has brought. And because he knows that it will require a feeling of absolute satisfaction to bring them back for reorder purchases, he will give his biggest value for the price charged, in order that he may receive the year-after-year return from their patronage.